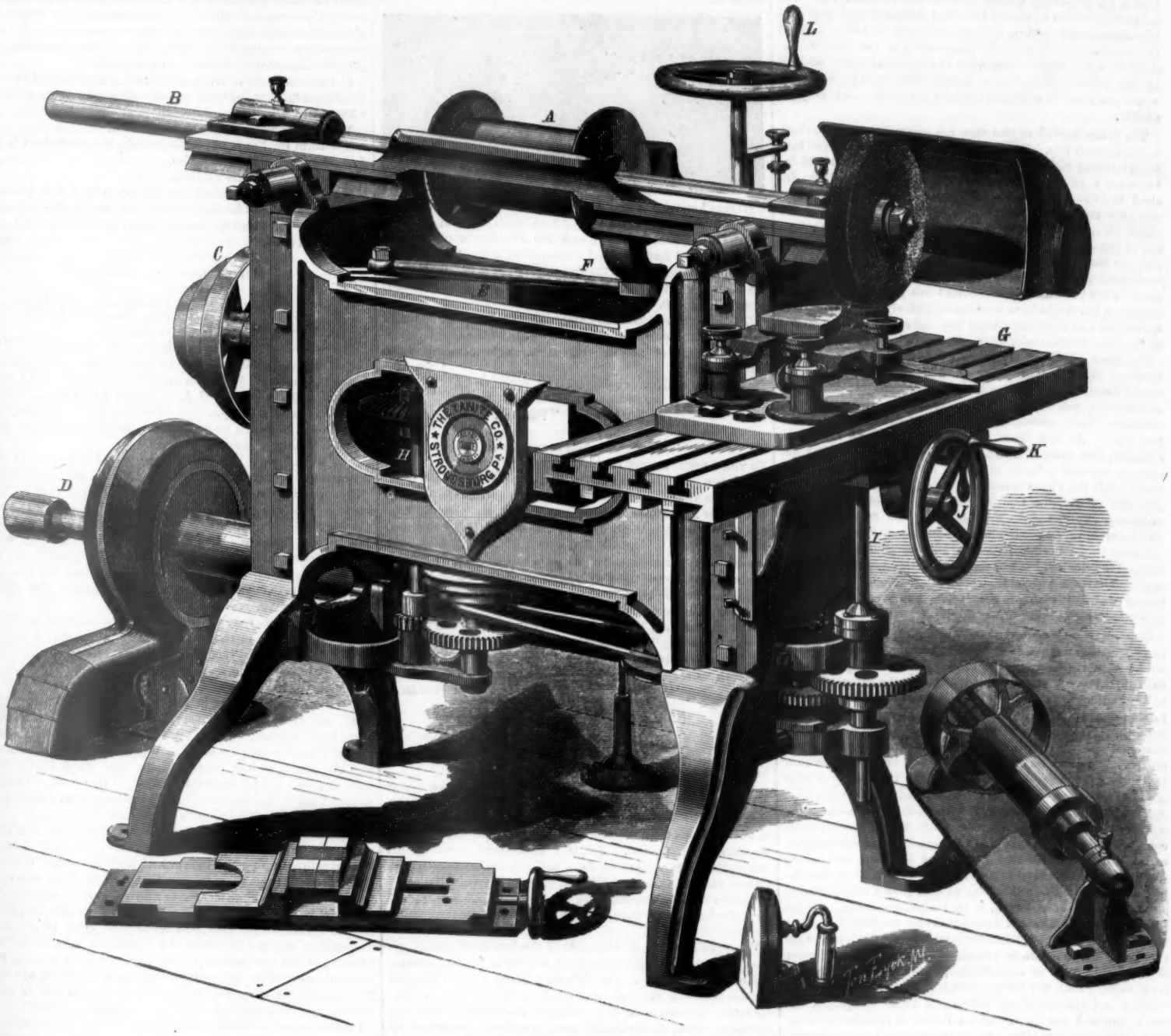
RAILROAD GAZETTE

SATURDAY, NOVEMBER 14, 1874.

The Tanite Company's New Milling Machine.

The Tanite Company, of Stroudsburg, Pa., have now on exhibition at the Fair of the American Institute in this city, and at the Franklin Institute, Philadelphia, a new machine, in which an emery wheel is used, for the first time, for surfacing files and sad irons, finishing anvils, nuts, gibs, keys, slide valves, straps, slides, crossheads, and in short, for accomplishing the majority of work now surfaced on the ordinary planer, milling machine, or shaper. It will be remembered that the emery wheel made by the above-named corporation is of the solid type, and a brief review of the advantages claimed for it may appropriately precede the mechanical description of the large and fine engraving herewith presented of the machine above referred to.



THE TANITE COMPANY'S NEW MILLING MACHINE.

The solid emery wheel performs the office of a rotary file, the cutting edges of which never grow dull: in other words, it retains its efficiency as a cutting tool until literally worn out. It is hard, and cannot be broken by a fall or blow; it travels uniformly and steadily at a high speed, the latter exceeding, with safety, that of the grindstone, while the emery cuts faster and lasts longer than the sand. Being composed of an artificial mixture, its grit is more even than that of the natural substance; and the waste of material and time lost in making changes is said to be less than is the case with the wooden wheel. Finally, the solid wheels are successfully used for putting the cutting edges on tools of all descriptions, and they may be produced of any shape, fitted for any special work.

The size and clearness of our illustration will enable the forming of an excellent idea of the details of the machine. The driving belt acts upon the pulley, *A*, secured to shaft, *B*. The latter at its left-hand extremity carries another belt, leading to a counter shaft attached to the floor (represented detached, and lying on the right of the machine), whence a third belt returns to the pulleys, *C*, and a fourth to the blower shaft, *D*. Through suitable mechanism, the pulleys, *C*, actuate the slotted crosshead, *E*, the revolution of which communicates, by the rod *F*, reciprocating motion to the main shaft, *B*, and thus imparts to the emery wheel, represented on the right-hand extremity of said shaft, a transverse movement across the sad iron, which is shown secured in the chuck on the table *G*. In addition to performing this labor, the gearing, immediately driven by pulleys *C*, also rotates the vertical shaft *H*, which in turn transmits power to the cones on its right. These again (through the medium of a belt, other cones, and further suitable interposing mechanism) revolve a vertical rod, I, the lower end of which is fitted with a globe joint. Its upper extremity carries a pinion, which, by means of the handle, at *J*, may be thrown into action with one or the other of two racks under the table *G*, so that the latter, by manipulating the handle as required, may be caused to travel automatically to and fro under the emery wheel, and over such distances as may be necessitated by the dimensions of the work. The hand wheel, at *K*, allows of similar movement to be imparted to the table by hand, in circumstances where the automatic motion is not desired.

The mode of operation consists in adjusting the work in the chuck to the proper elevation and starting the machine. The surface of the sad iron, for example, is thus carried under the wheel, and at the same time the latter is drawn across it; and this continues until the motion of the table transports the object out of the action of the grinder. The workman then gives the handwheel, shown at *L*, a part of a turn, thereby moving a fine screw which passes through an arm on the table, thus slightly elevating the latter, so as to give new surface for the tool to take upon. The handle *J* being shifted, the work travels back under the wheel, and so the operation is repeated as often as is desired, or else a new article is substituted after one passage under the emery. To avoid injury to tools and workmen, a small suction blower, with the necessary pipes and an enlarged receptacle in rear of the wheel, is provided, and so arranged as to draw away all dust, and at the same time to be easily removed for setting the work. For keys and similar small articles, a different chuck (see sample in the foreground of the engraving) is needed.

The machine, it is claimed, allows of using the wheel to its full capacity, while protecting the same against uneven wearing, thus rendering the employment of the diamond tool unnecessary. The cut made is much deeper than has hitherto been considered possible to accomplish by the emery grinder. The manufacturers also claim that in those articles in which first-quality iron is used, on account of its being more easily worked, the use of their wheel will soon save enough valuable metal to pay for a machine. From a careful examination of the apparatus, these advantages appear to us to be well substantiated.

These machines are manufactured only by the Tanite Company, who may be addressed as above.—*Scientific American.*

Atlantic & Southeastern.

At a meeting of the board in Hopedale, O., October 24, it was decided to locate the road as far as that place. The engineers are now surveying the line between New Lisbon and Saline ville.

Contributions.

The Saratoga Agreement.

NOVEMBER 4, 1874.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I trust no one will consider my article of last week on the "Saratoga Agreement" a wanton attack upon the framer of that document. It is indeed a fit subject for satire, but my main object was to point out the imperfections of the instrument, the too evident *nonchalence* of some of the parties to it, and the audacity of certain parties in inviting co-operation on such a basis. The bearing of the Eastern magnates has always been arrogant toward their connections. Eastern managers have almost invariably treated with coldness every proposition emanating from Western sources, and have refused to enter into any enterprise which originated beyond the roar of the Atlantic waves. Yet, forsooth, when to carry out some scheme devised by the august quadrilateral, as your correspondent "Archimedes S. Watts" designates certain parties, the assistance of Western men is necessary, they are summoned to the foot of the throne and there admonished after this fashion: "Gentlemen, you are aware that evil practices have crept into railroad management. We have heard that you have often of late discussed among yourselves the question of how to reform these bad habits. We understand that you fully realize the great waste consequent on reckless competition, and that you are prepared to act in concert to procure such reforms as may appear feasible. Now, gentlemen, we will tell you the cause of the deplorable demoralization which prevails among you, and we will prescribe to you the remedy. Your *subordinates* are the ones who do the mischief. They are the evil-doers. You have not been able to control them. Now the remedy is this: delegate your powers to certain commissioners nominated by us, but whom you can formally elect. Let them fix rates and punish those of your subordinates who may disobey their orders. Do this and all will be well. The Commissioners will fix rates so as to please everybody. We answer for it; but if anybody is displeased why turn him out, set upon him, strip him and devour his substance." What an absurd scheme! based like the airy

fabric of a vision, it, too, must dissolve. The rewards held out to the contracting parties are higher rates, a reduction of the expense of getting business and a cessation of cuts. Just how these ample rewards are to be attained is not yet apparent. The companies who, in order to get business, found it necessary to reduce rates and to pay commissions, are still in the same position. What is to be their compensation for loss of business? What is to make them patient and of long suffering? There are certain channels through which traffic will flow as naturally as water seeks its level. Dams and cuts are necessary to turn its course. The roads which solicit patronage are not all on equal terms. The idea of getting all of them to join in such an agreement as that concocted at Saratoga is so puerile that one cannot impute it to the able men who stand forward as the originators of the plan. Beneath the surface there must be a design more practicable. Thinking of this I am reminded of Lord Raglan's peculiar way of tiding over difficulties in his councils, as described by Kinglake in his splendidly written work on the Crimean war. Important questions he always broached delicately and ever had in readiness some trifling question of detail to bring forward the moment matters were not progressing in the line he desired them to. Rather than have an important point decided by the council of war in a manner adverse to his views, he would postpone its consideration and act on his own responsibility.

The prime movers in this case are ostensibly three parties, in reality only two. They declared that they had entered into an agreement with each other and with a fourth party to inaugurate a sweeping reform, in which movement they desired the co-operation of other companies. These other parties they summoned to Saratoga, where were unfolded the plans. Now the fourth party was not represented at Saratoga nor at any subsequent meeting. Some time ago it elected to play a "lone hand," and it has throughout acted in a manner consistent with that choice. The representation that it was a party to the pre-Saratoga movement was probably not strictly veracious, but might have been susceptible of some explanation. It may be well to inquire what was the status of the parties at the time this compact is said to have been consummated.

For many years five rivals had contested for the latitudinal traffic of the continent. Two of these had been to a certain extent despised by its fellows, one on account of its senility and frosted powers, the other on account of its youth and modesty. Three strove fiercely, dealing each other many a foul blow. At this time one of the three was failing in strength, like Samson shorn of his locks, and was fast becoming an easy prey to either of its two immediate lusty rivals; but the hitherto despised ones had begun to put forth powerful efforts, the one rejuvenated, the other grown to manhood. The struggle was becoming too furious to last. The injuries of each party were becoming too many and too grievous to be borne in silence. Those who had hitherto secured the lion's share saw their proportion rapidly diminishing. What more natural than that they should devise some means of strengthening themselves. The question then was how many allies could they secure?

Combination is a word of fearful import in the minds of many. Instinctively we all dread and hate it, yet always hold ourselves in readiness to combine when by doing so we can gain anything. A Vice-President of one of the companies said to have entered the Saratoga compact remarked to me when talking of that affair: "I am down on all monopolies except my own." 'Tis human nature. However much we may hate combinations and envy the combiners, coalitions are inevitable until such time as Karl Marx is crowned universal Dictator. Howling at the moon does not disturb the tranquility of that placid orb, neither will our imprecations disturb the serenity of the "quadrilateral," or rather, as I see it, the tri-lateral. As the moon is of more use to us than the clouds of aerolites or erratic comets that permeate space, so I believe a strong combination of railroad companies that have some interests in common would be more beneficial to the country at large than the demoralizing competition that has so long prevailed and which, although it has been useful, is no longer necessary. Therefore, if by and by I hear it announced that the New York Central, the Erie and the Pennsylvania have entered into what the Hon. Mr. Windom is pleased to stigmatize as the most objectionable form of combination, to wit: a joint-purse arrangement, I shall not be surprised, and my estimate of the wisdom and honesty of the officers of those companies will rise a hundred per cent. This alliance is one that must be contracted sooner or later. It is being forced upon the parties, who are playing their last card, which, unfortunately for them, is not a trump, in endeavoring on the one hand to inveigle Young Hercules, the Baltimore & Ohio, into a suicidal compact, and on the other are striving to entrap the Western force, into an alliance against the Baltimore & Ohio. The game is already played out. The features of the struggle are changed. It is no longer road against road; it is territory against territory. The New York lines must prepare to carry through traffic at very low rates if they do not wish to see a large portion of their Western business diverted. Already they have suffered to some extent. If my information is correct, during the late panic, New York cars rusted on side-tracks, while Baltimore cars were rolling day and night. To carry at low rates and yet avoid ruination all "outside" expenditure must cease. It will not do to pay 90 cents on the dollar to *get* business. The companies serving the same territory must cease mutual warfare. The trilateral would, of course, like to form a square, but they cannot, and they must remain isosceles.

HINDOO.

"Farmer's" Solution of a "Problem in Location."

TO THE EDITOR OF THE RAILROAD GAZETTE:

Without wasting time in preface or introduction, "Farmer's" solution of "W. W. H.'s" problem on location is simply an imposition—on himself only, let us hope. He says "the side $B\ H$ and the angles B and H are known."

The angle at H is known, but at B only the *right-angle* is known. He says: "The side $B\ G$ and the angle G are shortly obtained." Nonsense, Mr. "Farmer;" try again.

T. J. Long, C. E., says $B\ F = R \times \text{Tan. } \frac{1}{2}a$, $F\ G = B\ G - B\ F$. That is true, Mr. Long, but what of it? The angle "a" is not known and $B\ F$ is not known. The demonstration excels that of the "Farmer," because it has any quantity of tangents and sines, but never a tangible sign of solving the problem.

The proposition itself, as given by "W. W. H.," does not smack very strongly of mathematical precision. That he finds it necessary to "swing" is indeed about the amount of his data.

Allow me to plagiarize part of "W. W. H.'s" proposition, and by putting the question in definite shape give "Farmer" a chance to lubricate and burnish up his machinery for the solution.

Having located the line $A\ B\ C\ D\ E$, consisting of the two-degree curve $A\ B$, five hundred feet long, the tangent $B\ C$, eighteen hundred feet long, and the five-degree curve $C\ D$, three hundred feet long, and terminating in the tangent $D\ E$, it is found necessary that the five-degree curve should terminate in the same tangent, $D\ E$, and three hundred feet (ahead) from the point D.

Let us have a formula to determine the required tangent point in the three-degree curve, the length of the new tangent, and the length of the five-degree curve terminating in the tangent $D\ E$.

D. T.

ATCHISON, Kansas, October 28, 1874.

A Note from "Farmer."

FARMWELL, Loudoun Co., Va., Nov. 9, 1874.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I find in your issue of the 7th inst. what is, to say the least, a needless attack upon a note of mine published in the GAZETTE of October 24. Your correspondent, "G. C. B.," devotes himself mainly to statements of what I gave every man who ever ran a railroad line credit for knowing, when I indicated, hastily, a proper method for the proposed change. I did not suppose that, even one who might need to ask so simple a solution, could be blind to the points which "G. C. B." takes so much pains to criticise.

The answer from Mr. Long is better than mine; but if there is any "*puerility*" in this discussion, Mr. Editor, it is certainly to be found in "G. C. B.'s" attempt at wit, the display of which must have been the sole motive for his communication.

FARMER.

Friction of Car Journals.

ST. LOUIS, November 5, 1874.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Your correspondent, "P," of October 31st, details a series of experiments from which he draws certain conclusions incorrectly. While it would be impossible to prove the conclusions to be erroneous from the data given, he certainly has no right to claim them proved. For, if I understand correctly his description, his apparatus does not measure correctly the strains exerted under the different circumstances. His spring measures the *total* tension upon the belt. This, however, is a far different matter from the tension *effective* in overcoming the friction.

The tension on the *driving* side of the belt must always exceed that on the dragging, or there will be no motion communicated to the pulley. The *difference* between these tensions on the opposite sides of the belt gives the *effective* tension operating to overcome the frictional resistance of the axle journals. Now, theoretically, (and practically confirmed by Morris' experiments on belts), the sum of the two tensions should be the same at whatever velocity the belt is driven, and equals the total tension on the two sides of the belt when at rest (initial strain). This, however, depends upon the perfect elasticity of the belt within its range of use. Now, we well know no material is perfectly elastic, but only approximately so within certain restricted limits. The working tension of well-tanned leather belting of the ordinary thickness of 3-16 inch is given by various reliable authorities, (Morin, Harwell, Briggs), at 55, 66 or 66⅔ pounds per inch of width. Having entered this element of confusion into his experiments, it would be difficult to determine any legitimate conclusions from them. Do not understand me as appearing as an advocate for the laws of friction as usually understood. I believe they lead to very grave and costly errors. Most of the determinations of the laws and coefficients of friction have been determined from experiments which are entirely different from the circumstances under which we are operating our most important mechanisms. For example, all of the experiments of Morin on friction, from which our coefficients of friction are usually taken, were made under pressures not exceeding 29 pounds per square inch of bearing surface, while our commonest machines run into the hundreds. The experiment made by your correspondent "P" is intended to represent a car journal, and has 5,150 pounds upon a journal of 3¼×7 inches, so that there is a wide field for experiment upon this subject. But no good can be derived from any experiment unless it is made so that its conclusion can be relied upon. Therefore it requires that all interfering elements and unknown quantities must be provided against.

T. C.

CHICAGO, November 4, 1874.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The unsatisfactory results of his experiments on the friction of car journals cannot surprise your correspondent "P," as both his reasoning and machine are defective. A look at any rudimentary treatise on mechanics or natural philosophy will convince him of the truth of this assertion. It is true the results of experiments on the friction of journals in general made by the most eminent scientists must be taken very cautiously, as the conditions under which these experiments were made differ materially from those under which friction takes place in car journals. Furthermore, direct experiments on the friction of car journals, made as early as 1843, have given the most contradictory results. Of these latter experiments, those made in 1863 by the Superintendent of Machinery of the Hanoverian State Railways deserve the most credit and reliance, on account of the simplicity of the apparatus employed. The results of those experiments are:

1. The coefficient of friction for iron or steel axles, bearings of composition metal and sperm oil, varies from 0.009 to 0.0099.

2. For brass bearings the same is 0.0141.

3. Within the limits of practical loads, the coefficient is independent of the load, and also,

4, of the speed of the vehicles.

It would, therefore, follow that the friction of the journals is mainly influenced by the condition of the bearing surfaces, by the alloy employed for bearings, and by the kind of lubricating fluid used.

DR.

"Maps Guaranteed Correct."

ROOM 12, CHAMBERLAIN'S BUILDING.
CLEVELAND, Ohio, November 9, 1874.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I have read with much satisfaction the remarks of "G. A. C.," of Alton, Illinois, printed in your issue of November 7 under the caption "Maps 'Guaranteed Correct,'" and I have great pleasure in giving "G. A. C.," (who will, I hope, be kind enough to make me acquainted with his name, at least), the information for which he expresses a desire concerning "Mr. Goodwin's idea of accuracy in maps."

"G. A. C." says that he was surprised to learn that the maps named in your issue of October 17 bore the inscription: "This map is guaranteed correct;" and further, that he has never seen a like statement upon any map, nor heard of the placing of such a guarantee on any maps. He hopes, however, that in the future we may have many maps on which, with good warrant, the inscription "Guaranteed correct" may be placed. He believes, too, that such a thing may be done at "moderate cost," but finally questions whether the thing has yet been done.

I think that I thoroughly understand the animus and correctly estimate the intent of "G. A. C.'s" remarks. I am not surprised that he was "surprised," nor that he desires to learn more of the facts in the case before accepting my "guaranty" as conclusive testimony as to the accuracy claimed.

I fully agree with him in his opinion that to do accurate work one must have the services of "accurate" men. We must have accurate, capable and experienced workers. One cannot always secure the aid of men possessing these qualities, and who are moreover conscientious; who think that to depict, and thus record an untruth is to do an act more blameworthy than is the utterance of any ordinary false statement; but to produce truthful maps we must find these men.

I agree with "G. A. C." when he says that there is an immense amount of work to be done in our cities, and in surveys of railroad properties in cities, if accurate maps thereof are to be made; also when he says that "an Engineer who can 'come forward' and guarantee to make a survey and map of a district in which his measuring in length shall not exceed an error of 1¼ inches per mile, and his angular error be not over 5 seconds of arc, or 1.28 inches at a distance of a mile, and in addition to this can perform his work at a cost of not over 33 per cent. more than on ordinary accurate methods, will be *** scorned by lawyers who make their thousands out of our present 'accurate surveys' as they are commonly called."

I cannot however testify from experience that an engineer "coming forward" as aforesaid, will be "welcomed" with anything like effusion, "by thousands of railroads, mines and cities."

The "railroads, mines and cities" almost invariably say that their maps are "correct enough for practical purposes;" and thereupon in many instances proceed to pay ten times the price of a good map in costs in court in actions that never would have been instituted had plain, truthful, well authenticated, and accurate maps been made showing the premises affected by these actions.

One is often disheartened while striving to impress upon the mind of the eminently "practical" man the fact that the engineer, the artist writing "C. E." after his name, begs to be *permitted* to make a good map as much for the sake of truth and art as for the sake of the dollars that he would receive for his labor.

Men calling themselves engineers there are, doubtless, who are not troubled by qualms of conscience on account of the deficiencies of their work, and who would be puzzled to do work accurately if accuracy were demanded of them. These persons, with those who tolerate them, cost our "railroads, mines and cities" much money in counsel's fees, and "legal" expenses, so nominated in the vouchers.

Painters, when they make a picture "to sell," call it a "pot-boiler."

Many "maps" are made that have not even the poor claim

upon the charitable consideration of the parties who are "sold" by them that the "pot-boilers" have.

Those through whose policy the making of such maps is perpetuated I fain would enlighten, and in that direction I claim to have done my duty.

The survey and map made for the Lake Shore & Michigan Southern Company, noticed in the GAZETTE, were undertaken by myself at a price acknowledged by the Chief Engineer of the company to be less than the probable cost of the survey if made by his men in the "ordinary way."

The district covered by the survey is bounded throughout about two-thirds of its contour by established "dock lines" and actual wharfage, the remaining one-third is defined by the waters of Lake Erie.

The district is a little over a mile in length, and has a width, at one point, of about a quarter of a mile; the greater part of it is occupied by the Lake Shore and the Cleveland & Pittsburgh railroad companies; there are in it a few manufacturing establishments, to each of which railroad tracks are laid. The railroad tracks on the territory measure altogether about ten miles.

There are no streets defined upon the ground, but the tract contains nominally 53 city "blocks" and 45 "lots," with streets and alley-ways. The buildings, of which there are one hundred on the tract (if we count each L and T and annexe as a "building") are set, with a few exceptions, without reference to street lines.

In order to make the map an authority it was necessary to exactly establish the positions occupied in 1863 by a certain line of railroad track, and the course of a certain reach of river channel "as it was in 1826."

The work was done and accepted under the very exact specifications of a duly executed written contract, drawn by myself and of my own motion.

No written agreement would have been exacted of me, but I preferred to work under such a writing, desiring in this case, as in all like cases, to *induce* a strict scrutiny of my work.

My agreement with the Engineer of the Lake Shore was to the effect that the map should be "accurate," and attention was directed to the fact that the word "accurate" was used with a full comprehension of its significance, and a critical test of the map in this regard was invited.

I "came forward" some years ago and offered to contract to make accurate surveys and maps of tracts of any kind or size, and have made several large "yard" and "city property" maps for railroad companies, and land maps for other corporations, any one of which I can certify to be "correct," although no *formal* guaranty of correctness was given, and I am always ready to undertake such work at prices much within "G. A. C.'s" limit.

The excellence of my latest maps has been due in great part to the skill and scrupulous exactness of my assistant, both in field and office-work.

For measuring angles in the surveys named a "transit" of the ordinary form has been used. Lineal measurements have been made with a heavy steel tape frequently tested with a U. S. standard measure, also of steel. In measuring across docks, etc., a copper wire is used; this is tested for length before and after measurements, and is carried on a suitable reel.

In the survey for the Lake Shore & Michigan Southern, in establishing a principal base-line and putting in a system of transit points for use in triangulation, a very irregular circuit of about three miles was made, and some twenty principal stations fixed. The angular error in this principal survey was within the limit suggested by "G. A. C." as allowable.

The mean of six distinct observations for each angle was used in calculations. The position of each object in the survey was fixed instrumentally. In indicating a point for observation by the instrument a fine pin, relieved by a white background, or a fine line, plumbed by a heavy "bob" and properly secured in position, was used.

In plotting the map, which is on a scale of 1-600, distances were laid off under a lens of considerable power. Persistent and unremitting care, intelligently exercised, has, I think, produced, in the instance under consideration, a map upon which I could confidently write "guaranteed correct," and I hope that "G. A. C." will not fail to examine the map, if opportunity for doing so offers itself to him.

J. M. GOODWIN.

General Railroad News.

TRAFFIC AND EARNINGS.

—Speaking of October lake and canal rates the Buffalo *Express* says:

"Freights, both lake and canal, have advanced somewhat over last month, but have not ruled strong and active. The highest lake rates reached was 4c. on corn from Chicago, and 5½c. on wheat from Milwaukee, to Buffalo, and the lowest rate during the month was 2¾c. for corn and 3c. for wheat. The average for the month was 4.3 wheat and 3.7 corn. The highest canal rate during the month was 10½c. on wheat and 9c. on corn from Buffalo to New York, the lowest being 8½c. on wheat and 7½c. on corn. Singularly, the average for the month, which is 9.5 on wheat and 8.5 on corn, is precisely the same as last month. The following table indicates the averages for the month of October, this year, and for the same month in 1873 and 1858. It will be noticed that the average lake rates for October this year are about the same as those of the same month in 1858:

	—Lake freights—		—Canal freights—	
	Wheat.	Corn.	Wheat.	Corn.
October, 1874	4.3	3.7	9.5	8.5
October, 1873	7.8	6.8	12.7	11.3
October, 1858	4.25	3.7	13.6	12.1

—The earnings of the Connecticut River Railroad for the year ending September 30 were:

	1874.	1873.	Increase.	Decrease.	P. C.
Passengers	$347,704	$348,738	.....	$ 1,034	0¼
Freight	321,527	365 964	.....	44,437	12¼
Other sources	37,174	3 ,602	$572	.....	1¼
Total earnings	$706,405	$751,304	.....	$44,899	6
Operating expenses	442,628	487,120	.....	44,492	9¼
Net earn ngs	$263,777	$264,184	.....	$407	0¼

The earnings were $12,614 per mile in 1874, and $13,416 in 1873. Expenses were 62.7 per cent of earnings in 1874 and 64.2 per cent. in 1873.

—The earnings of the Boston & Albany Railroad for the year ending September 30 were:

	1874.	1873.	Increase.	Decrease.	P. C.
Earnings	$8,963,127	$9,798.032	.....	$834,905	8½
Expenses	6.548,211	7,561,159	.....	1,012,948	13¾
Net earnings	$2,414,916	$2,236,873	$178,043	.....	8

The earnings per mile were $33,445 in 1874, and $36,560 in 1873. The expenses were 73.06 per cent. in 1874 and 77.17 per cent. in 1873.

—The earnings of the Great Western Railway of Canada for the week ending October 16 were: 1874, £23,067; 1873, £25,694: decrease, £2,627, or 10¼ per cent.

—The earnings of the Grand Trunk Railway for the week ending October 17 were: 1874, £49,500; 1873, £46,400; increase, £3,100, or 6¾ per cent.

—The shipments of through freight eastward over the Central Pacific Railroad during September were: San Francisco, 5,282 tons; interior points, 978 tons; total 6,360 tons, or 636 carloads. The leading items were: wool, 986 tons; salmon, 767 tons; tea, 609 tons; fruit, 508 tons.

—The shipments of refined oil east from Pittsburgh by the Pittsburgh, Washington & Baltimore road for the week ending October 31 were 9,571 barrels, against 1,821 by Pennsylvania and Allegheny Valley roads.

—The earnings of the Indianapolis, Cincinnati & Lafayette Railroad for the four months from July 1, to October 31 were:

	1874.	1873.	Increase.	Decrease.	P. c.
Earnings	$649,207 68	$711,321 32	.....	$62.113 64	8¾
Expenses	364,890 00	447,092 00	.....	82,202 00	18¾
Net earnings	$284,317 68	$264,229 32	$20,088 36	.....	7½

Per cent. of expenses, 1874, 56.21; 1873, 62.85. Earnings per mile, 1874, $3,627; 1873, $3,974.

—The earnings of the Cairo & St. Louis Railroad for the first three weeks in October were $24,110.56.

—The receipts of crude petroleum at Pittsburgh for the ten months ending with October were 1,337,458 barrels in 1874, against 1,590,671 in 1873. The exports of refined were 849,732 in 1874 and 720,122 in 1873.

—The petroleum exports of the United States for the ten months ending with October for seven years have been:

1868	86,535,963	1872	124,038,519
1869	87,818,093	1873	200,972,929
1870	119,874,729	1874	203,558,174
1871	131,065,442		

Of these exports in 1874, 64 per cent. was from New York, nearly 32 per cent. from Philadelphia, 2.4 per cent. from Baltimore, and 1.6 per cent. from Boston. The production of the Pennsylvania wells since their opening is reported at about 57,000,000 barrels.

—The flour and grain receipts of the six western lake ports, St. Louis and Peoria for the week ending Oct. 31 when compared with those for the corresponding week of 1873 show a decrease of about 1 per cent. in flour, of 45 per cent. in wheat, 33 per cent. in corn, and 22 per cent. in oats. Compared with the previous week of this year there is a still larger decrease in all except wheat. The grain receipts at these places for the three months ending with October were this year 22½ per cent. less than last, 14 per cent. less than in 1872, and 10 per cent. less than in 1871.

—Of the eastward flour and grain shipments from the western lake ports for the week ending Oct. 31, 41 per cent. of the flour, 1½ per cent. of the wheat, 19 per cent. of the corn, and 56 per cent. of the oats went by rail.

—Of the grain shipments from Buffalo for the week ending Oct. 31, about 33 per cent. went by rail.

—The tonnage of anthracite coal over the lines given for the ten months ending October 31 was as follows:

	1874.	1873.	Inc. or dec.	P.c.
Dela., Lacka. & Western	2,133,575	2,628,177	Dec. 494,602	18¾
Lehigh Div., Central of N. J.	2,266,529	2,376,792	Dec. 110,263	4⅝
Dela. & Hudson Canal Co.	1,991,960	2,447.653	Dec. 455,693	18⅝
Pa. Coal Co. by Erie Ry	1,108,647	1,053,276	Inc. 55,371	5⅛
Shamokin Div., Northern Cen.	500,649	554,587	Dec. 53,938	9¾
Summit Branch	408,600	412,916	Dec. 4,316	1
Totals	8,409,960	9,473,401	Dec. 1,063,441	11¼

—The earnings of the Central Pacific Railroad for October were: 1874, $1,507,000; 1873, $1,375,470; 1872, $1,285,567; increase, 1874 over 1873, $131,530, or 9 9-16 per cent.; increase, 1874 over 1872, $221,433, or 17¼ per cent.

For the ten months ending October 31 the earnings were: 1874, $11,824,903; 1873, $11,574,276; 1872, $10,593,011; increase, 1874 over 1873, $250,627, or 2¼ per cent., increase, 1874 over 1872, $1,231,892, or 11¼ per cent.

—The earnings of the Hannibal & St. Joseph Railroad for the three months ending October 31 were: 1874, $612,063.65; 1873, $597,554.33: increase, $14,514.32, or 2¾ per cent.

—The earnings of the James River & Kanawha Canal for the year ending September 30 were:

	1874.	1873.	Increase.	Decrease.	P. c.
Earnings	$158,928.01	$155,270.06	$3,657.95	.....	2⅜
Expenses	103,788.63	97,394.28	6,394.35	.....	6⅝
Net earnings	$55,139.38	$57,875.78	.....	$2,736.40	4¾

Per cent. of expenses 1874, 65.31; 1873, 62.73.

—The earnings of all the Pennsylvania Railroad Company's lines east of Pittsburgh for the past six months are reported as follows:

Gross receipts	$19,696,642
Expenses (63.32 per cent.)	12,450,963
Net earnings	$7,245,679

—The tonnage of Cumberland coal over the lines given for the ten months ending October 31 was:

	1874.	1873.	Inc. or Dec.	P. c.
Baltimore & Ohio	1,187,126	1,335,379	Dec. 148,253	11⅛
Chesapeake & Ohio Canal	686.948	689,936	Dec. 2,988	0¾
Bedford Div., Penna. R. R.	62,278	89,233	Dec. 26,955	30¼
Totals	1,936,352	2.114,548	Dec. 178,196	8¾

—The anthracite coal tonnage of the lines given (whose year begins December 1) for the eleven months ending October 31 was as follows:

	1874.	1873.	Inc. or Dec.	P.c.
Philadelphia & Reading	5,653,483	5,937,301	Dec. 283,818	4¾
Schuylkill Canal	618.011	642,153	Dec. 24,142	3¾
Lehigh Valley	3,710,410	3,852,865	Dec. 82,456	2¼
Pennsylvania & New York	655,500	640,348	Inc. 15.252	2¾
Totals	10.697,404	11,072,667	Dec. 375,163	3¼

—The earnings and expenses of the Ohio & Mississippi Railway for the three months ending September 30 were:

Earnings ($2,194 per mile)	$862,644 09
Expenses (64.44 per cent.)	555,907 00
Net earnings ($781 per mile)	$306,737 09
Extraordinary expenses	1 ,46 56
Surplus	$296 090 53

Transfers, formerly included, are deducted from the earnings and expenses.

—The earnings of the Atchison, Topeka & Santa Fe Railroad for the month of September were: 1874, $110,563; 1873, $152,555; decrease, $41,992, or 27½ per cent.

—The earnings and expenses of the Union Pacific Railroad for September were:

	1874.	1873.	Increase.	Decrease.	P. c.
Earnings	$1,063,993 05	$1,068,936 66	.....	$4,943 61	0½
Expenses	393,180 15	501,838 54	.....	108,658 39	21¾
Net earnings	$670,812 90	$567,098 12	$103,714 78	.....	18¼

For the nine months ending September 30 the report is as follows:

	1874.	1873.	Increase.	Decrease.	P c.
Earnings	$7.520,184 98	$7,366,024 61	$154,160 37	.....	2½
Expenses	3.563,216 59	3,692,882 75	.....	$129,666 16	3½
Net earnings	$3,956,968 39	$3,673,141 86	$283,826 53	.....	7¾

Earnings per mile, 1874, $7,287; 1873, $7,138. Per cent. of expenses, 1874, 47.38; 1873, 50.13.

—The tonnage of bituminous coal over the lines given for the ten months ending October 31 was as follows:

	1874.	1873.	Inc. or Dec.	P. c.
Huntingdon & Broad Top	258,552	396,552	Dec. 138,000	34¾
Clearfield coal over Tyrone Div., Penn. R. R.	554,567	510,246	Inc. 44,321	8⅝
Pa. & N. Y. (eleven months)	276,128	269,836	Inc. 5,292	2
Totals	1,088,247	1,176,634	Dec. 88,387	7½

—The coal tonnage of the Pennsylvania Railroad for the ten months ending October 31 was: Coal, 2,216,517 tons (2,240 pounds); coke, 388,521 tons; total, 2,605,038 tons, or 260,504 car loads, equal to 6,513 trains of 40 cars each.

—The earnings of the Atlantic & Pacific Railroad and leased lines for the first week in November were: 1874, $104,900; 1873, $98,147; increase, £6,753, or 6⅞ per cent.

—The earnings of the Denver & Rio Grande Railway (main line) for the fourth week in October were: 1874, $11,984; 1873, $9,800; increase, $2,184, or 22.3 per cent.

—The leading grain receipts at Chicago for the week ending November 7 show a large falling off as compared with those for last year, amounting to 25 per cent. in flour, 58¼ per cent. in wheat, 73 per cent. in corn, 50 per cent. in oats. There was an increase of 33 per cent. in live hogs, and of 50 per cent. in cattle. The fall traffic will turn out to be the lightest for many years.

—The earnings of the Denver & Rio Grande Railway (main line) for September, were:

	1874.	1873.	Increase.	Decrease.	P.c.
Earnings	$36,498 40	$34,326 24	$2,172 16	.....	6.3
Expenses	19,878 73	15,556 93	4,321 80	.....	27.8
Net earnings	$16,619 67	$18,769 31	.....	$2,149 64	11.4

Earnings per mile, 1874, $309; 1873, $291. Per cent. of expenses, 1874, 54.47; 1873, 45.32.

—The earnings and expenses of the Toledo, Wabash & Western Railway for the year ending June 30, 1874, are reported as follows:

Gross earnings ($8,731 per mile)	$5,483,213 20
Expenses (76.91 per cent.)	4,217,681 89
Net earnings ($2,015 per mile)	$1,265,531 31

—The following companies have reported earnings for October:

	1874.	1873.	Increase.	Decrease.	P. c.
Atlantic & Pacific	$152,100	$115.503	$36,597	.....	31¾
Central Pacific	1,507,000	1,375,470	131,530	.....	9½
Chicago, Danville & Vin.	81,918	79,099	2,819	.....	3½
Illinois Central	804.097	797,122	6,975	.....	0¾
International & Great Northern	147,797	81,762	66,035	.....	80¾
Marietta & Cincinnati	198,528	185,784	12,744	.....	6⅞
Ohio & Mississippi	381,022	323,801	57,221	.....	17⅔
Pacific of Missouri	367,300	353,168	14,132	.....	9⅝
St. Louis, Alt. & T. H.	123,747	112,378	11,369	.....	10⅛
St. Louis, Iron Mt. & So.	358,776	238,198	120,578	.....	50½
Toledo, Wabash & Western	475,127	586,251	.....	$63,124	11¾

THE SCRAP HEAP.

Rails in Europe.

At a recent letting of rails for a Dutch railroad, a Belgian firm offered iron rails at $34 per ton of 2,000 lbs., and the contract was let to the German Bochum for steel rails at about $45 per ton. There were fourteen competitors for the contract, including English, German, Belgian and French works.

It has been decided to make all renewals in steel on the Saxon railroads hereafter.

The *Moniteur des Interets Materiels* says: "It is no longer doubtful that the *iron roads* of Europe will become *steel roads* within a few years from now, to the great profit of the companies working them, and the safety of the passengers."

The Grand Central Company of Belgium has let a contract to the Angleur works for 3,000 tons of steel rails, to be delivered next year, at about $50 per ton of 2,000 lbs. These works have orders which will keep them fully employed until the end of 1875; and generally in Europe the steel works are fully employed, while the iron works are still suffering for want of work.

New Bridge over the Danube.

From the *Revue Industrielle* we translate: "On the 26th of September a test was made of the first span of the great bridge constructed by Schneider & Co., of Creusot, France, over the new channel of the Danube near Vienna. The bridge has four spans and rests on two abutments and three piers. Each span has a clear opening of 262½ feet; the span is of 279 feet; so that the total length of the bridge is about 1,115 feet. The width is about 37 ft. 9 in., of which 25 ft. 3 in. is for the roadway and 6 ft. 3 in. for each sidewalk.

"The load uniformly distributed upon the floor and consisting of 33,600 granite paving stones was about 1,120 lbs per square yard. After an hour's test the trellis beams suffered a deflection of 1 inch on the upstream and 1¼ inches on the downstream side. A horizontal deflection of these beams was feared because they are not tied at the upper ends; but this was not realized. The trial there has given a result which should be noted as so much the more remarkable since the Government had indicated 3¼ inches as the maximum permissible deflection, while the deflection observed reached only about one third of this limit."

A Train Accident.

A correspondent sends us some notes of an accident which occurred on the Louisville, Cincinnati & Lexington road, September 19, and which reached us too late to be included in our September record. In this case, as the train was running at a high rate of speed the forward axle of the forward tender truck broke short off at the fit, and, finding some obstacle, the other end broke off also at the fit. The wheels went rolling on under the tender while the axle dropped on the track, and, as the train passed over it, carried away almost every brake connection in the train, besides throwing off the rear truck of the baggage car. The latter, however, though not held by check-chains, kept parallel with the track, and in this condition the train ran over half a mile and around several short curves, without doing any further damage than to break the leg of a man who was standing on a platform and was thrown off.

RAILROAD GAZETTE

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Editorial Announcements.

Addresses.—*Business letters should be addressed and drafts made payable to* THE RAILROAD GAZETTE. *Communications for the attention of the Editors should be addressed* EDITOR RAILROAD GAZETTE.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

SLIDE VALVES.

In the RAILROAD GAZETTE of last week attention was called to the importance of affording ample area of opening of the steam port during the periods of admission of steam to the cylinders of locomotives when the link is worked near mid gear and when the valve is cutting off short. We then called attention to the advantage which the Allen valve possessed in this respect, and to the fact that it gave twice the area of opening of the admission port when the travel of the valve was considerably less than its full throw. The engravings of this valve we reproduce again, in order that it may be distinctly before the minds of our readers. While it is important that there should be ample area of opening of the port during admission, it is also equally or more important that the opening for the escape of steam should be sufficient, so that the back pressure on the piston will be reduced as low as possible. It should also be remembered in this connection that the flow of gases from one chamber to another is due to the diff rence of their pressure, and that the greater this difference is, the greater will be the flow through any given orifice. Another fact should also be kept in mind here. If steam is cut off at quarter stroke, the volume of steam admitted into the cylinder is much smaller than that which must be exhausted. Thus, if we have a 16x24 in. cylinder and cut off steam of 100 pounds pressure at 6 in. of the stroke, 1,206 cubic inches of steam must be admitted into the cylinder. If this steam is released at 17 in., it has expanded into a volume of 3,417 cubic inches and 35 pounds pressure. In the one case we have 1,206 cubic inches of steam of 100 pounds pressure flowing into a chamber, the pressure in which varies according to the speed of the piston and the area of the opening; in the other case we have 3,417 cubic inches of steam whose maximum pressure is 35 pounds when it is first released, but which diminishes as part of it escapes into the open air. Without going into any abstruse calculation, obviously more time and more area of opening will be required to allow the exhaust steam to escape from than will be required for the live steam to enter the cylinders. For these reasons, therefore, a free release has been thought by most locomotive engineers to be more important than a free admission. Without attempting to discuss the relative importance of the two, the preceding considerations indicate very clearly that they are both very important. With the form and proportions of the ordinary slide-valve, the effect of the lead, as all who have studied the subject know, is to hasten the period of release; that is, the steam from the cylinder is exhausted before the piston reaches the end of the stroke. This is done in order to give ample time for the expanded steam to escape before the piston begins the return stroke, and thus reduce the back pressure. Undoubtedly there is a loss of energy from this cause which could be utilized if the expansive force of the steam could be allowed to act against the piston during a longer period, and until it had approached nearer the end of the stroke; but, as explained before, part of the expansive energy of the steam must be sacrificed in order to reduce the back pressure during the return stroke. To accomplish the latter, therefore, the steam is released earlier in the stroke, thus giving more *time* for it to escape. Now if it were possible to increase the *area* of the exhaust opening, obviously less *time* would be required for the steam to escape. To do this, and at the same time increase the area for admission, as is done by the Allen valve, represented in figs. 3 and 4, the operation of which was explained last week, has been the object of a number of inventions which will now be explained.

The one which resembles the Allen valve most closely is the invention of Mr. William Wilson, who is Master Mechanic on the Chicago, Burlington & Quincy Railroad at Galesburg, Ill., and it was patented April 21, 1868. His invention is represented in figs. 5 and 6. In fig. 5 it will be seen that it doubles the opening for the admission of steam in exactly the same way as is done with the Allen valve; that is, when the valve opens the port c at f, it also simultaneously uncovers the auxiliary steam-way a a at e. Steam therefore enters at e and passes through the steam-way a a and enters the steam-port c at b, as indicated by the darts.

It will be observed, however, that the valve-face is made with two exhaust ports, g and g', and that the valve has two pairs of auxiliary exhaust-passages, m m, n n, and m' m' n' n'. In fig. 6 the valve is represented as moving in the direction of the dart A, and in the position at which the steam is released from the steam-port c. It will be seen that when this occurs the exhaust passages n n are uncovered at i and m m at l simultaneously, and that the steam can escape from the port c through both of the openings i and l and the passages m m and n n at the same time, or, in other words, this valve gives double the opening for the exhaust that the ordinary valve does, and therefore accomplishes for both the admission and the exhaust what the Allen valve does for the admission alone. A number of these valves are or have been in use on locomotives on the Chicago, Burlington & Quincy Railroad, and are reported to give very good results.

The objection to this valve is that it cannot be used in an ordinary valve-face, but must have one made specially for it. As two exhaust ports are required in the face the of latter, the valve must be considerably larger than the ordinary valve, and consequently must bear more pressure, from which of course results the necessity of employing more power to move it. These objections have, we believe, prevented its more extended use, notwithstanding the fact of its giving a very much better distribution of steam than the ordinary valve.

On August 29, 1864, Mr. John Gleason patented the form of valve represented in figs. 7 and 8. This has a stationary or fixed saddle, A A, on top of the valve, with two cavities, B, B', in the under side of this saddle. The steam passages a, a', and the exhaust passage H pass entirely through the valve C C. In fig. 7 it is repr sented in the position at which the valve has just commenced opening the port c for the admission of steam to the cylinder. It will be seen that simultaneously with the opening of the port c at f the cavity B is uncovered at e, and that steam can then enter the port c through the cavity B and passage a at the same time that it enters at f. In fig. 8 the valve is represented in the position in which it is just beginning to open the port c to the exhaust. It will be seen from the engraving that simultaneously with the opening at i the cavity B is uncovered at l, so that steam can flow through the passage a into the exhaust cavity H, as indicated by the darts, at the same time that it escapes at i. This valve therefore accomplishes very similar results to those which the Wilson valve effects. The proportions of the Gleason valve are bad, however, and the relation between the width of the steam and exhaust ports c, d, and g, are such as are never found on modern locomotives. In addition to what we have represented in figs. 7 and 8, Mr. Gleason also patented some appliances for relieving the valve from the pressure of the steam on top of the saddle. These have not been regarded as of sufficient importance to be described here. His invention evidently embodies the principle the use of which may secure all the advantages of the Wilson valve without making it necessary to enlarge the valve or valve-face. Seeing this Mr. Wm. S. Hudson, Superintendent of the Rogers Locomotive Works, was led to design the form of this valve shown in fig 9. In this the ordinary proportions of steam and exhaust ports are used in the valve-face, and the valve is the same in principle and somewhat similar in form to that shown in figs. 7 and 8. It will be seen from fig. 9 that it gives double openings e, and f, for the admission of steam, and fig. 10 shows the double openings for the exhaust. Mr. Hudson has also made provision for balancing this valve by carrying the saddle AA down on each side of the valve, as shown at I I, fig. 12, which is a transverse section of the valve. These side pieces rest on the valve seat outside the valve, and the la ter is accurately fitted, so as to work steam-tight under the saddle and yet not bear any of the pressure on top of it. The saddle is held in position longitudinally by the lugs and bolts F F, figs. 9 and 12.

In fig. 10 it will be noticed that, with the proportions given, very soon after the port c is opened to the exhaust at i it begins to close it at l, so that comparatively little advantage is gained on the exhaust side with the proportions given for this valve.

This difficulty might be obviated by making the passage a wider, as indicated by the dotted line m n, fig. 10. If this is done, however, live steam would blow through from the steam-chest to the exhaust port when the valve is in the position shown in fig. 11.

This last evil might be overcome by narrowing the cavities B, B', as indicated by the dotted lines in fig. 11. If this is done, it will, however, be necessary to cut away the exhaust edge X an amount equal to that which has been filled into the cavity B, in order that the edge X may release the steam simultaneously with the lower edge Y. The modifications, or rather proportions, we have indicated have in fact been employed by Messrs. Babcock & Wilcox, of New York, in stationary engines. But it will be observed that the passage a can, under no circumstances, be wider than the bridge M between the steam and exhaust ports, because if it is live steam it will be certain to blow through before the valve has opened the port wide at c. The firm referred to above, and it will be seen from the engravings, Mr. Hudson, also have made the bridges M M wider than the steam ports c and d. Now, in many locomotives the bridges are considerably narrower than the ports, so that it would be impossible to get the full advantage of the double openings on both the steam and exhaust sides of the valve.

To overcome the preceding difficulties the writer has proposed the form of valve shown in figs. 13, 14 and 15. In this two steam passages, a d and a' d', are employed at each end of the valve. By this means the full advantage of the double opening on both the steam and exhaust sides is gained, as is shown in figs. 13 and 14. In fig. 14 it will be noticed that the passage d will not begin to close until the port c is opened at i a distance equal to the width of d. In fact, the same advantage of double opening is gained with this form of valve that results on the steam side alone with the Allen valve, or on both the steam and exhaust with the Wilson valve, while at the same time its size is very much smaller than the latter, and it can be used in any ordinary valve-seat, which is not possible with either the Wilson valve or with Mr. Hudson's form of the Gleason valve, if the latter is modified so as to get the full advantage of the double openings on both the steam and exhaust sides.

In the table below, the width which the steam ports are opened for the admission of steam, with different amounts of travel, is given for the ordinary valve and for the Allen valve. All the other valves described give an amount of opening for the admission of steam equal to the Allen valve, but they are not all equally effective in releasing the steam. It may be said that if the exhaust nozzle is contracted, there is no advantage in having an area of opening of the steam-port to the exhaust larger than the area of the exhaust nozzle. This however is only partly true, because undoubtedly the res stance offered to the escape of the steam is greater if it must force itself through two narrow openings than it would be if it must pass through one only. It is also believed by many engineers that there is much advantage from having the exhaust port open quickly, and that when that occurs the draft is stimulated much more than it is if the port is opened slowly. Now, with the valves described, especially with the last form, the exhaust when it begins to open is opened twice as fast as it is with the ordinary valve. It is therefore possible to delay the release somewhat, and thus utilize a larger proportion of the expansive force of the steam; or, if the hypothesis of nearly all master mechanics is correct, the exhaust will be very much more effective in stimulating the fire if opened suddenly than it will if opened more gradually, and therefore with a valve similar to that which was last described it is probable that the area of the exhaust nozzle may be somewhat en-

Travel of valve.	Total width of opening of steam-port.	
	Ordinary valve.	Allen valve.
2 inch	⅛ inch.	¼ inch.
2¼ inch	⅛ inch.	¼ inch.
2½ inch	⅛ inch.	⅜ inch.
2¾ inch	⅛ inch.	⅜ inch.
3 inch	⅛ inch.	⅜ inch.
3¼ inch	⅛ inch.	⅜ inch.
3½ inch	⅛ inch.	⅜ inch.
3¾ inch	1 inch.	1 inch.
4 inch	1⅛ inch.	1⅛ inch.
4¼ inch	1⅛ inch.	1⅛ inch.
4½ inch	1⅛ inch.	1⅛ inch.
4¾ inch	1⅛ inch.	1⅛ inch.
5 inch	1¼ inch.	1¼ inch.

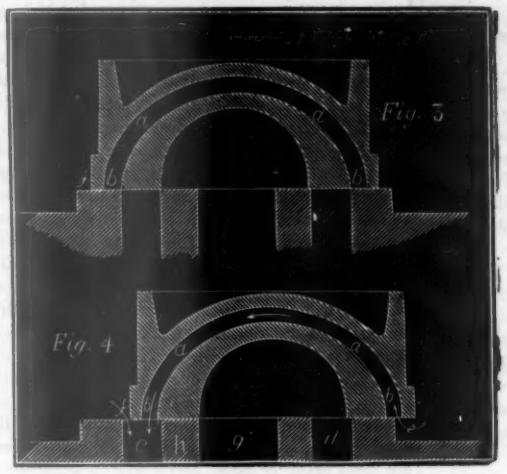
Fig. 3
Fig. 4

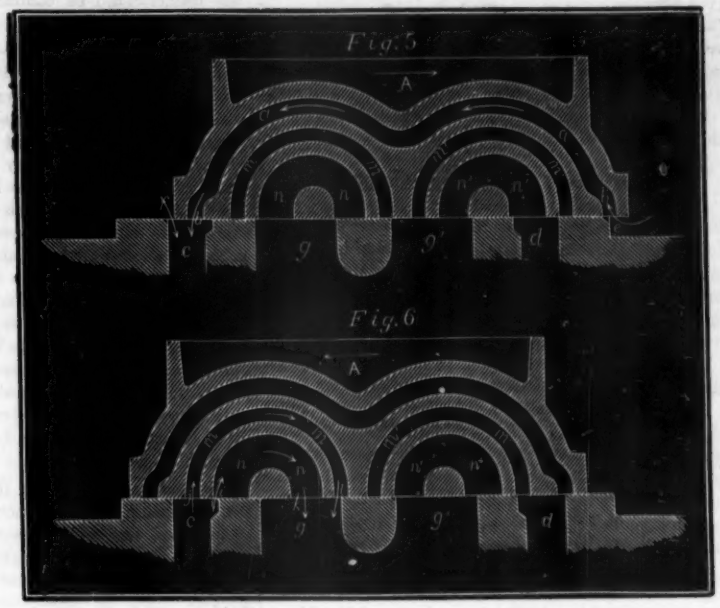
Fig. 5
Fig. 6

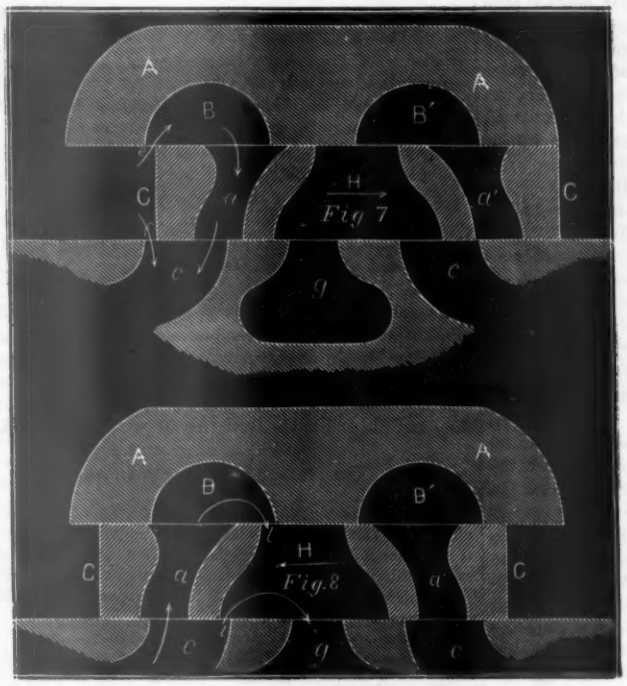
Fig. 7
Fig. 8

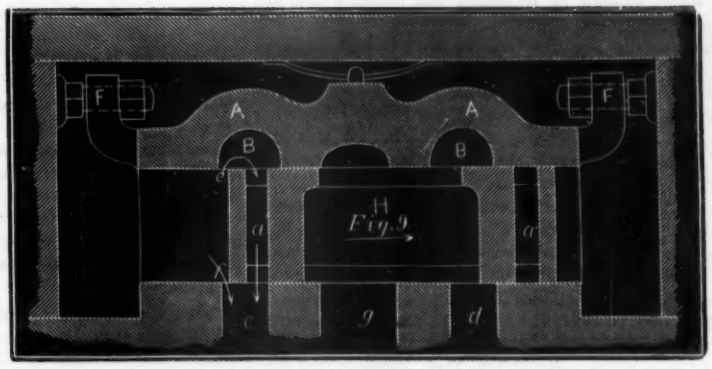
Fig. 9

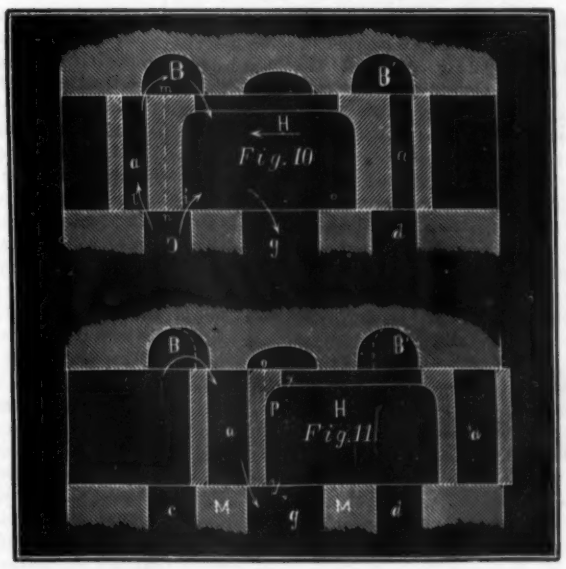
Fig. 10
Fig. 11

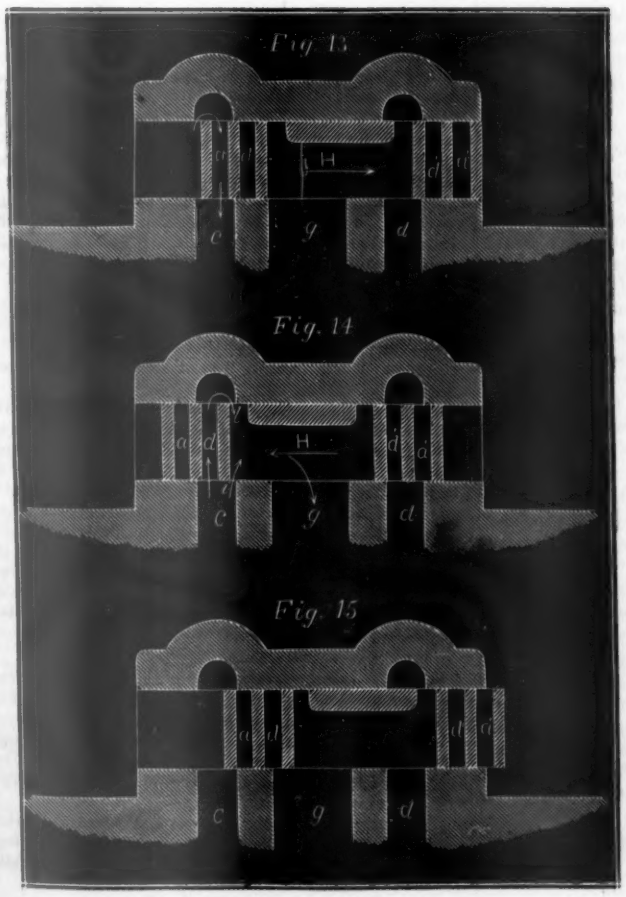
Fig. 13
Fig. 14
Fig. 15

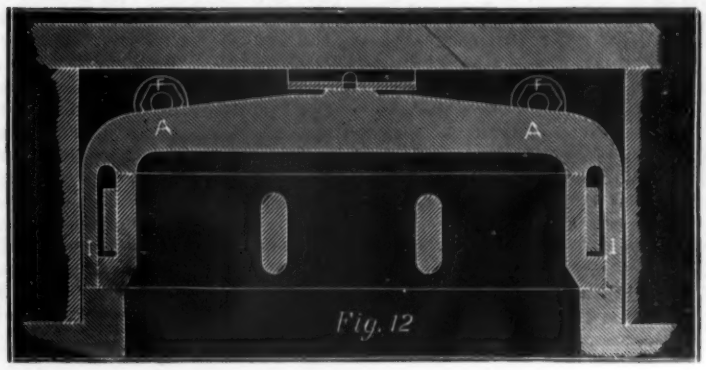
Fig. 12

larged, and yet have the blast equally effective in stimulating the fire.

The method proposed by Mr. Hudson for balancing the valve, or relieving it from pressure, also promises to be successful, and is, perhaps, the simplest plan thus far proposed. It therefore seems as though some form of the Gleason valve was worthy of a trial, and that its use would result in considerable economy.

NEW YORK GRAIN DELIVERIES.

The whole grain business at New York seems to be conducted on an antiquated system. Fortunate in having the export business in grain established there by the opening of the Erie Canal for years before any other seaboard cities could obtain any appreciable share of it, the customs of trade which grew up in these early days when New York had the monopoly of the traffic seem incapable of improvement now, when the methods of carrying grain have largely changed, and when the greater grain traffic on the Western lakes, received under somewhat similar circumstances, has been organized on a system of wonderful simplicity, efficiency, and economy, worthy, one might think, of general imitation, wherever the traffic is large enough. But there is a *vis inertiæ* in trade customs which is capable of an almost hopeless opposition to change, whether it be reform or no ; and this is not the consequence of prejudice simply, but also of the adaptation of all the machinery of business to the old and long established forms, however imperfect they may be. The tree grown among rocks is ill nourished truly, distorted, dwarfed, but its roots have fitted themselves to the hard and rough surfaces of the stones, and filled the crannies where there is a little earth ; and we cannot transplant it to a more favorable situation without giving it a severe shock and perhaps sacrificing some of its members, though the final result may be most favorable. In the trade of New York and of most old cities—more perhaps in other branches than in the grain trade, but in that also—the very obstacles to free and cheap handling create business and give many men profitable employment which is destroyed by a reform, just as the business of stage-coaches was destroyed by the introduction of railroads. Indeed, if it were not for the competition of rival commercial towns, it seems doubtful if old cities would ever reform their methods of doing business.

When the Erie Canal was opened all possible transportation was by water. Whatever the destination of the boat-load of grain which reached New York, it was almost sure to make at least part of its further journey in a vessel of some kind. Whether it was to be stored, or to be shipped, it was a matter of indifference, almost, to the canal carrier where he should discharge his boat, provided the receiving warehouse or vessel were somewhere in the waters of New York Harbor. Thus the great grain stores were established on the cheaper wharves of the Long Island shore, and the custom was established of delivering the boat-load of grain at any dock or alongside of any vessel in the harbor that the consignee might designate. This was, substantially, because any point in the harbor as much as any other is the terminus of the canal route.

After the railroads to the West were completed and began to carry grain to New York, they found the local customs of the grain trade established in this way—adapted quite well to canal traffic, but not at all to the railroads, which latter had definite and limited termini in New York and Jersey City, and not an indifferent terminus anywhere in the harbor, as the the canal boats have. The railroads could bring the grain to certain wharves, but not to others, and instead of going to the ships the ships must come to them to be loaded, unless an intermediate carrier is employed by some one.

Now there is nothing novel in this situation, and in it there is little difficulty in providing for a very economical transfer from cars to store, or from cars or store to vessels. The grain ports on the Western lakes receive nine-tenths or more of their grain by rail, and ship nearly all of it by water, and they have provided for it by elevators which work with the slightest possible expenditure of labor, occupation of ground and of water front, and with unequalled rapidity and certainty. However, one of the conditions of the successful working of the elevator system is an organization of the grain traffic which shall provide for the inspection and grading of the grain as it arrives, so that it will not be necessary to keep the thousands of individual consignments separate, but only the different kinds and grades of grain ; so that the warehouse does not pretend to deliver to the consignee the identical lot of grain which was consigned to him, but only an equal quantity of the same quality. The elevators have wrought a great economy in the matter of transfers, but after all it is the grading of grain rather than the labor-saving machinery of the elevator which is at the bottom of this economy.

This system has been in operation almost from the beginning of the grain trade of Chicago and Milwaukee, the first of which has a larger grain traffic than New York, and so far from its being inadequate or involving serious evils to the grain trade, it is universally acknowledged as a great economy and facility, and it is difficult to see how the traffic could be conducted without it or something equivalent.

But this greatest of "modern improvements" in grain traffic has not yet been adopted in New York, the great grain, exporting city of America. It clings to the methods which grew up with an exclusively canal traffic and were perhaps well enough suited to that. The consignee requires not merely as many bushels of the same kind of grain as were consigned to him, but the identical grain. He wants it, too, not at the terminus of the railroad carrier's route, but at any vessel or wharf he may designate, probably enough five or six miles from the railroad terminus and accessible to it only by water. Thus, the actual necessary expenses connected with the transfer of grain from car to store or vessel are several times as great in New York as in Chicago or Milwaukee, and this great and unnecessary expense somebody must pay, and whoever may pay it, the excess of cost over the improved method puts New York at a disadvantage when compared with other exporting cities which avail themselves of the modern methods of handling grain.

Doubtless in New York there are obstacles to the system of grading which do not exist to the same extent in other cities, and certainly not in the lake cities. It receives a greater variety of grades than any other city, and minute gradations in grains designed for certain local markets must be preserved with an exactness which might not be easily attained by a system of inspection and certificates so well as by a delivery of the particular grain shipped to the consignee. But the obstacles are not formidable ones, as has been confessed by both railroad companies and grain merchants in an agreement between representatives of both made last Summer, and, so far as this practice is concerned, approved by the Produce Exchange. At this time the Exchange made its acceptance of the plan of grading grain conditional on the railroad companies' assuming the expense of elevating to consignee's vessel or warehouse. The railroad companies insisted that their delivery should be in the lighters which they would place at the consignee's vessel or wharf, thus extending their route from the terminus of their roads to any point in the harbor, but leaving the consignee to unload the vessel in which this further transportation should be made.

Later, the railroad companies gave notice that there after they would deliver grain in lighters only when the consignment should be as much as five car-loads in amount. The basis of this regulation is a perfectly reasonable one. A car-load of grain makes but a small part of a load for a lighter, and it will cost just about as much to transfer a smaller quantity as a full lighter load. Moreover, there is a similar economy in handling the cars at the New York terminus. Five can be switched from the train and run down to the wharf to meet the lighter quite as cheaply as a less number. Naturally, the carrier would give the lowest rate to the traffic which costs least. The regulation is an old one, but in the frequent and bitter contests of the companies with each other it has been neglected, just as the companies frequently charge 30 cents on fourth-class traffic to Chicago, while they would never make a regular rate so low. For a year or more past, this regulation, never formally abrogated, was not enforced, and to the merchants of course it came with the effect of a new regulation. The grain merchants considered it as likely to prove injurious to their business, and the Produce Exchange appointed a committee to confer with the railroad managers on the matter.

This committee has recently rendered its report, or rather reports, for there were two. Four of the five committee-men recommended that the difficulty be obviated by adopting the grading system, previously agreed upon, paying under protest the charge for "elevating out." The fifth committee-man, Mr. Carlos Cobb, a very influential member of the Exchange, recommended the adherence of the Exchange to its former action, namely to offer to adopt the grading system on condition that the railroad companies assume the expense of discharging the lighters into consignee's vessel or warehouse. This minority report was adopted, which leaves matters *in statu quo*.

We believe that the grain merchants generally do not question the advantage to their trade of the proposed system of grading, even if they have to pay the disputed charge for elevating. Nor by their refusal of the plan recommended by their own committee as well as the railroad men do they escape any of the expenses of handling. The result and apparently the declared purpose of their action is to prevent the railroads from getting the advantage of the proposed improvement in grain handling, which in any event the merchants would share, unless they will agree to assume the expense of loading the merchant's vessels or of putting the grain in his warehouse. That is, they refuse to avail themselves of a proffered advantage because they want it made larger. The railroad companies meanwhile insist that the merchants shall pay the charge in question, and thus the introduction of the much needed reform is indefinitely postponed.

A great deal has been said about the railroads as common carriers being bound to "complete the delivery" of the goods which they transport, and it is quietly assumed that such delivery is not completed until the grain is put in the consignee's store. Those who reason thus forget what the railroad routes are. Their termini are not in the harbor of New York, but at certain definite points in the cities of New York and Jersey City, and no common carrier is bound to deliver goods beyond his own proper route. Now in the case of New York grain traffic the lighterage is as much a separate portion of the transportation as the lake transportation or the shipment to Liverpool. The railroad company is no more bound to carry grain from its cars to a Brooklyn store than to carry it to England. It is bound to deliver it safely housed at some point accessible to the consignee; but it is the safety and the accessibility of this storage which form the essence of the obligation, and the fact that the warehouse is on wheels or floats has nothing to do with it. It may be advantageous for the railroad carrier to undertake also the harbor carriage ; but nothing binds him to do it, and it is against public policy as well as his own advantage for him to do this latter work for the same price for large and small consignments, when it costs much more for the latter. The produce merchants say that such a policy will discourage small consignments. If so, it is because they are in their nature uneconomical, and so ought to be discouraged.

We think that the one point in which the railroad companies have been in fault has been in delaying so long the provision of great elevators for the grain which they receive. One company is now hard at work on such a structure, and the other two have designed them. They have urged that it was hazardous to expend money for such a structure when the grain trade was not organized to use it to the best advantage, and seemed likely to insist on its old methods and the provisions for loading and unloading already in use. But it is probable that if the facilities were once provided, the economy would be so great and so manifest as to lead to their use to a considerable extent immediately, when the greater part of the trade would soon be forced to adopt the same system. The other exporting ports, whose business is trifling compared with New York's, already have such facilities; their competition, if not the good sense of the New York merchants, will doubtless, eventually force the latter to adopt them also, and the sooner the better for all parties concerned.

The Franklin Institute Exhibition.

We omitted in our notice last week to refer to Mack's injector which was exhibited by the National Tube Works, of Boston, at work feeding one of the boilers. We have learned that a test of this instrument was made in competition with some other injectors which were exhibited, a report of which test we hope soon to publish.

Specimens of the Keystone injector, manufactured by Messrs. Jacob F. Miles & Co., of No. 625 Commerce street, Philadelphia, were also exhibited, some of them at work feeding boilers. We hope at an early date to publish engravings of both of them, showing their peculiarities.

Railroads in India.

According to the report of the Government Director, recently issued, there was in India last July 5,872 miles of railroad completed, which had cost on an average about $82,500 per mile. Of this 157 was of the metre gauge, the other of 5 ft. 6 in., and 727 miles had a double track. There was then under construction 817 of the wide and 1,033 miles of the metre guage. During the year covered by the report, 312 miles of new road was opened. Among these was an example of a cheap railroad of the India standard gauge, being a branch of the Bombay, Baroda & Central India Railway, which cost about $20,000 per mile, and the materials being brought from England. The Indus Valley road, which was first ordered to be of metre gauge, was ordered during the year to be made of the Indian standard, and the new line from Lahore to Peshaumer will be made of the same gauge, "if considerations derived from the advanced state of the works should not," in the opinion of the Viceroy, "be of sufficient importance to influence his decision.

As was to be expected in a country where money bears a high rate of interest, very few Indian railroad securities are held in India. There were on the 1st of January last 62,318 proprietors of these securities, 900 of whom residents, and of the latter 421 natives of India. Most of the capital invested in these roads has the interest guaranteed by the British Government. The total investment is about £100,000,000, and as the net earnings in 1873 were less than £3,200,000, without this guarantee it would be very unsatisfactory to the investors ; indeed, it would never have been made, doubtless. The gross receipts seem to have been about $5,700 per mile; the working expenses $3,020 or 53 per cent. The receipts per train mile were $2.04; the expenses, $1.08.

The traffic scarcely grows at all in India. In 1873 the net earnings were about a quarter greater than in 1869, the mileage having increased in just about the same proportion meanwhile. But the business of the country generally has scarcely made any progress in that time, the value of the exports being 5⅛ per cent. greater, and that of the imports actually 5 per cent. less in 1873 than in 1869.

It is altogether probable that the Indian railroad system would have been much more profitable, and could have been extended with profit if it had been constructed cheaply after

the example of the American railroads. Its capital account is something like 50 per cent. greater than the average of American railroads, though with the exception of wood and possibly some classes of skilled labor, the elements of cost have been probably less there than here, though some of our structures would not answer in the climate of India. The net earnings per mile are quite as large as those of American railroads. The recent efforts made to construct cheap railroads promise a good degree of success, but they may still not produce satisfactory results, because for the most part the cheap roads are built where the traffic is exceptionably thin, even for India.

Record of New Railroad Construction.

This number of the RAILROAD GAZETTE has information of the laying of track on new roads as follows:

Wood River Branch.—Completed from Richmond Switch, R. I., northward 5½ miles to Locustville. *Baltimore, Pittsburgh & Chicago.*—Completed by the laying of track from Albion, Ind., westward 115 miles to a junction with the Illinois Central in the town of Hyde Park, Ill., ten miles south of the Illinois Central depot in Chicago. *Chicago & Illinois River.*—Extended 6 miles to a point 20 miles southwest of Joliet, Ill. *Cairo & St. Louis.*—Track is laid from the southern terminus at Cairo, Ill., northward 5 miles. *Wisconsin Valley.*—Extended from Knowlton northward 20 miles to Wausau, Wis. *Central of Minnesota.*—Completed by the extension southeastward 6 miles to Wells, Minn. *Southern Pacific.*—The *San Joaquin* line has been extended from Kern River southward 3 miles to Bakersfield, Cal.

This is a total of 160⅓ miles of new railroad, making 1,524 miles completed in the United States in 1874, against 3,130 miles reported for the same period in 1873, and 5,840 in 1872.

PUNISHMENT FOR NEGLECT is provided for in the French railroad laws, as well as for malicious causing of accidents, and even for threatening to cause one. Article 19 of the law on railroad police of July 15, 1845, says: "Whoever, through lack of skill, imprudence, inattention, negligence, or disobedience of the laws and regulations shall have involuntarily caused on a railroad, or in the stations, an accident which shall have occasioned wounds, shall be punished with imprisonment for from eight days to six months, and with a fine of from fifty to a thousand francs. If the accident has caused the death of one or several persons, the imprisonment shall be from six months to five years, and the fine from three hundred to a thousand francs." Article 20 of the same law says: "Every engineman or brakeman who shall have abandoned his post during the running of a train shall be punished with imprisonment from six months to two years." This is worse than dismissal, which some trainmen think very hard. The first article provides a punishment which seems impossible in this country under existing laws. It will be remembered that the conductor and engineman of the coal train on the Chicago & Alton Railroad, who by running contrary to orders caused the terrible Lemont collision, killing about twenty persons and wounding as many more, could not be punished. The conductor was indicted for manslaughter, but, having been out on bail for nearly a year, on coming to trial was found "not guilty," there being of course no shadow of suspicion that he had intended any harm by the act which put his own life in extreme danger. This is a case in which many will feel justified in saying: "They do these things better in France."

SOME CORRESPONDENCE ON COMMISSIONS, which the recent agreements to do away with them has drawn out, has intimated pretty clearly that the companies would do well to pay up for some months' work already done on informing agents their services would be dispensed with hereafter. A General Ticket Agent of a Western railroad on sending to another passenger man the circular of the Chicago companies which declares that no commissions on sales of tickets will be paid after October 31 endorsed it as follows:

"For my private opinion of this and for ——'s consolation, I refer you to Ecclesiastes 1st chapter, 6th to 9th verses, inclusive. Hopefully thine."

For the benefit of those of our readers who have not access to the work quoted (though we are credibly informed that some railroad men do own copies) we have hunted up the quotation, which is as follows:

"The wind goeth toward the south, and turneth about toward the north; it whirleth about continually, and the wind returneth again according to his circuits.

"All the rivers run into the sea; yet the sea is not full: unto the place from whence the rivers come, thither they return again.

"All things are full of labor; man cannot utter it: the eye is not satisfied with seeing, nor the ear filled with hearing.

"The thing that hath been, it is that which shall be, and that which is done is that which shall be done: and there is no new thing under the sun."

The gist of the matter is in the last paragraph, we suppose.

The gentleman to whom the circular so endorsed was addressed, returned it with this further endorsement:

"Dear ——: Your consolation don't 'wash'—isn't worth a cent. See Matthew, chapter XXV., 29th verse, and give it up manfully. Dolefully thine. ——."

Again we save our readers from too great a disturbance of dust by looking up and printing the quotation:

"For unto every one that hath shall be given, and he shall have abundance; but from him that hath not shall be taken away even that which he hath."

As commissions for two or three months' sales reported before this circular was issued were due and unpaid, the agent felt singularly like "him that hath not," from whom it is sought to take "even that which he hath."

A HEAVY SENTENCE ON TRAIN WRECKERS as given last week, when the New Hampshire Circuit Court at Keene, N. H., after a full trial of one Joseph Ruff for putting obstructions on the track of the Ashuelot Railroad, found him guilty, but in consideration of his youth and low degree of intelligence, sentenced him only to two years at hard labor in the State prison. A man, however, named John Currier, who was convicted at the same time of hiring or bribing the boy Ruff to place the obstructions on the road, was sentenced to fifteen years at hard labor. In passing sentence the court referred to the aggravated nature of this class of crimes and the necessity of inflicting severe punishment for the protection of society.

This sentence leads us to think it would be well if all train-wreckers could be indicted and tried in New Hampshire hereafter.

General Railroad News.

ELECTIONS AND APPOINTMENTS.

—Mr. Elisha W. Bliss, long a section-master on the Connecticut River road, has been appointed Roadmaster of the Middle Division of the Chicago & Michigan Lake Shore road, with headquarters in St. Joseph, Mich.

—The United States Circuit Court has appointed Dewitt C. Barber Receiver of the Iron Mountain, Chester & Eastern Railroad.

—At the annual meeting of the Washington & Ohio Railroad Company in Alexandria, Va., November 4, Lewis McKenzie was unanimously re-elected President, with the following directors: Henry T. Harrison, Charles B. Ball, Henry Heaton, Loudoun County, Va.; Benjamin Morgan, Richard H. Lee, Clarke County, Va.; Cassius F. Lee, Fairfax County, Va.; F. W. M. Holliday, Frederick County, Va.

—At the annual meeting of the People's Railway Company held in Pottsville, Pa., November 3, the following were elected directors for the ensuing year: Charles Baber, Wm. M. Randall L. F. Whitney, Milton Boone, R. F. Lee.

—At the annual meeting of the Philadelphia, Germantown & Norristown Railroad Company in Philadelphia, November 2, Wm. Musser, Joseph Perot, Wm. H. Slingluff and I. V. Williamson (one-third of the board) were chosen managers for the ensuing three years. Richard Dale was elected to the board for two years to fill a vacancy.

—Mr. B. P. McDonald, Fort Scott, Kan., is President, and Mr. George D. Case, Fort Scott, Kan., Chief Engineer of the Fort Scott & Southeastern Railroad.

—The officers of the Spartanburg & Asheville Railroad Company are: President, C. G. Memminger; Vice-President, E. G. Aston; Secretary and Treasurer, A. C. Kaufman; Directors, George W. Williams, Gabriel Cannon, T. B. Jeter, Theo. G. Barker, D. R. Duncan, James E. Black, John S. Kennedy, J. D. Hyman, V. Ripley, R. W. Allen, G. W. Fletcher, E. R. Hampton. The company's office is at No. 25 Broad street, Charleston, S. C.

—Mr. Hinckley, formerly of the St. Louis, Kansas City & Northern road, has been appointed Superintendent of the Cairo & St. Louis Railroad in place of C. Hamilton, resigned.

—At the annual meeting of the Troy Union Railroad recently the following directors were chosen: W. H. Vanderbilt, E. D. Worcester, E. S. Morgan, H. R. Pierson, J. Tillinghast, J. M. Toucey, George B. Warren, G. H. Cramer, I. V. Baker, D. T. Vail, C. L. Tracey, Daniel Robinson and Mayor Kemp. The company owns the union depot in Troy, N. Y., and the railroad entrance into that city.

—At the annual meeting of the James River & Kanawha Canal Company in Richmond, Va., November 5, the stockholders elected Col. Charles S. Carrington President and Col. H. C. Cabell and Marshall Parks directors. The Board of Public Works of Virginia has appointed as State directors Franklin Stearns, S. C. Tardy and Dr. W. P. Palmer, Richmond, Va., and Mr. Robert G. Davis, of Lynchburg, Va.

—The following appointments have been made on the Baltimore & Ohio Railroad: Mr. W. C. Quincy is now General Manager of all the leased lines west of the Ohio River; William Walker, lately General Supervisor of Trains, is now Superintendent of the Central Ohio, Lake Erie and Straitsville divisions; John B. Peters, late Assistant Supervisor of Trains, is now Superintendent of the Baltimore, Pittsburgh & Chicago Division.

—At the annual meeting of the New Haven, Middletown & Willimantic Railroad Company in Middletown, Conn., recently, the following directors were chosen for the ensuing year: Julius Hotchkiss, L. A. Andrews, Evelyn White, R. W. Turner, Benjamin Douglas, Charles A. Buel, J. L. S. Roberts, A. M. Colegrove, C. C. Hubbard, J. N. Camp, William T. Elmer, Robert G. Pike.

—The directors of the Missalonskee & Kennebec Railroad Company met in Augusta, Me., November 5 and organized by electing Col. H. A. Dewitt, President; J. W. North, Treasurer, and E. F. Pillsbury, Clerk.

—Mr. C. Hamilton has resigned his position as Superintendent of the Cairo & St. Louis Railroad, and has been appointed Assistant Chief Engineer of the Cincinnati Southern Railroad.

—The officers of the Chicago & Illinois River Railroad Company are: President, A. McDonald; Vice-President, C. C. P. Holden; Chief Engineer, J. O. Hudnutt; directors, B. F. Allen, C. C. P. Holden, A. McDonald, Jesse O. Norton, C. L. Peck. The office is in Chicago.

—The Orange and Bolivar Point Railroad Company was organized at Orange, Tex., November 4 by the election of the following directors: Jerome Swinford, A. Gilmer, B. H. Smith, F. C. McReynolds, N. J. Moore, A. N. Vaugh, James S. Grinnan, Levi Jones and Henry Seeligson, of Texas; Chas. Shepherd, Springfield, Mo.; B. D. Crary, Omaha, Neb.; William Peete, H. W. Hubbell, of New York. The board elected the following officers: James S. Grinnan, Galveston, Tex., President; Henry W. Hubbell, New York, Vice-President; B. D. Crary, Omaha, Neb., Treasurer; Jerome Swinford, Orange, Tex., Secretary. The office of the company is at Orange, Texas.

—Mr. John Enders, of Richmond, Va., has been chosen President of the Richmond & Trans-Alleghany Railroad Company, in place of J. D. Imboden, resigned.

—Mr. Charles Hilton, C. E., has charge of the construction of the New York Central & Hudson River elevator on the North River between Sixtieth and Sixty-fifth streets.

—Mr. Fayette Curtis is appointed in charge of the Fourth Avenue Improvement to succeed Mr. Isaac C. Buckhout.

—The officers of the Chicago Railway Construction Company are: President, John H. Rice; Vice-President, F. W. Peck; Secretary, F. W. Rice; Treasurer, B. F. Allen; directors, B. F. Allen, J. O. Hudnutt, A. McDonald, Jesse O. Norton, F. W. Peck, J. H. Rice, E. H. Talbot.

PERSONAL.

—A card in a recent number of a Belgian paper announces that "Mr. Alexander Holley, civil engineer, of the United States, offers his professional services to any company on the continent of Europe which may desire to establish steel works of the most recent American type."

—Mr. W. H. H. Shinn, Agent at Columbus, O., for the Pittsburgh, Cincinnati & St. Louis Railway, died in that city November 1.

OLD AND NEW ROADS.

Pennsylvania—New York Division.

A large number of men have been discharged by the contractors on the new cut through Bergen Hill, as that work is approaching completion.

A number of the signals along the line are being renewed, and all are being altered to conform with the new code of signals recently adopted.

Iron Mountain, Chester & Eastern.

In the suit of Samuel N. Maxwell against this company, the United States Circuit Court for the Southern District of Illinois has appointed DeWitt C. Barber, Receiver, and has placed him in possession of the road. All net earnings after paying current expenses are to be used in paying debts due for labor or supplies furnished the road since April 1.

Henderson & Overton.

The contract for the construction of this Texas road, from Henderson, Tex., northwest to the International at Overton, has been let to Ward, Dewey & Co., lessees of the Texas penitentiary. It is to be completed by August 1, 1875.

Southwestern & Rio Grande.

The contract for the first section of 10 miles from Shreveport, La., southwest has been let to O'Connor & McCabe, of Iowa, who are to begin work about November 15.

Indianapolis, Bloomington & Western.

In their advisement the committee of first-mortgage bondholders, Messrs. Taintor, Wyckoff and Denny, say: "This committee is working in harmony with the committees representing the Danville firsts and Bloomington seconds to put the road in the hands of trustees for the bondholders to pay interest on the bonds according to their legal position without the cost and delay of lawsuits."

There seems to be some confusion among the various committees, and the position of some of them is not very clearly defined.

The Secretary of the second-mortgage bondholders' committee is Mr. Adrian Van Sinderen, not Van Guideren as his name was printed in a former number of the GAZETTE.

Grand Rapids & Indiana.

This company has bought three acres of land in Richmond, Ind., for $18,000, and will build extensive machine and repair shops there.

Hannibal & St. Joseph.

The company has filed with the Secretary of State of Missouri its acceptance of the provisions of the act of March 21, 1874, providing for the issuing of renewal bonds, the stockholders of the company having assented to such acceptance at a meeting to be held at Hannibal November 2. Fifty of the renewal bonds of the sum of $1,000 each were prepared in September, but the company not having complied with the requirements of the law, the delivery of the same was delayed. The bonds are signed and are now ready for exchange.

The company advertises that the following State bonds issued in aid of the road and maturingin 1875 will be paid on presentation at the Treasurer's office in New York at par and accrued interest upon presentation: $100,000 due April 4, 1875; $200,000 due June 8, 1875; $130,000 due September 24, 1875.

Baltimore, Pittsburgh & Chicago.

The last rail on this road has been laid and the ballasting and finishing up is very nearly done. The first passenger train from Baltimore through to Chicago will leave the former city November 15 and will carry the General Passenger Agent and several other officers of the Baltimore & Ohio. Regular trains will begin to run very shortly.

The new road, which has been built more quickly and with less trouble than almost any other line of similar length and importance in the country, starts from Chicago Junction, O., 88 miles north by west from Newark, O., on the Baltimore & Ohio's Lake Erie Division, and runs thence a very little north of west across Ohio and Indiana to a junction with the Illinois Central about 10 miles south of the depot of that road in Chicago. The whole length of the road from Chicago Junction to the junction with the Illinois Central is 258 miles, and to Chicago 268 miles. The road is absolutely under the control of the Baltimore & Ohio, and was built with money furnished by that company.

The length of the Baltimore & Ohio line from Baltimore to Chicago is 836 miles. The Pennsylvania line to Baltimore is 800 miles long.

Rockford, Rock Island & St. Louis.

Mr. W. H. Ferry, the receiver appointed by the United States Circuit Court, took formal possession of the road November 5. The receivers appointed by the Henry County (Ill.) Circuit Court, Messrs. Cable and Lynde, surrendered the road to him in accordance with an order from that Court.

New Orleans, Mobile & Texas.

This company has made a reduction of 20 per cent. in the wages of employes, the reduction to take effect from November 1. A number of the employes in Mobile left work in consequence.

Western Maryland.

A proposition has been made to the City of Baltimore by a company recently organized and known as the Baltimore & Western Maryland Railroad Company. This corporation proposes to take the road and assume the first and second preferred mortgages with the accrued interest (amounting in all to $1,460,000), the city to assume all other liabilities and to release all its interest in the road except $280,000 first-mortgage bonds with accrued interest. In return the company will agree to spend $500,000 in improving the present road; to build an extension from Hagerstown, Md., to Johnstown, Pa., with branches to the Broad Top coal region and to the coal fields on the North Branch of the Potomac; and to build an extension of seven miles from Baltimore to deep water at Curtis' Creek. Further, all net earnings from the present road in excess of 6 per cent. on $3,000,000 are to be paid to the city.

There appears to be a strong opposition to the plan and its adoption is by no means certain.

Erie.

Much complaint is made by employes of delay in the payment of wages. A special grievance is also complained of by many of the men working in the Jersey City shops, who have heretofore lived at places a short distance out on the road and have been allowed to ride to and from their work free. These men are now obliged to buy commutation tickets, which, however, are sold to them at a special rate, lower than the usual charge.

The Superintendent of the Delaware Division has found it necessary to issue a special order requiring train-men to strictly enforce the rule prohibiting gambling in the cars.

The Port Jervis shops are working only eight hours per day.

Vermont Central.

The first-mortmage bondholders met in Boston, November 7, to concert measures for securing payment of their claims. It was stated that the default in the payment of interest had continued since 1864. In 1867 the liabilities which had precedence to the first-mortgage bonds were $3,5000,000. Between 1867 and 1872 the trustees have increased the liabilities which were regarded by them as having prior claim to the

sum of $7,000,000. After a long discussion, in which much difference of opinion was made manifest, it was finally resolved to appoint a committee of three to represent the interest of the bondholders in the bill for incorporating them into a new company, which is now pending in the Vermont Legislature. This committee is instructed to do what is possible to aid in the passage of the bill.

New York Central & Hudson River.

Orders have been given for a reduction of 10 per cent. in the force employed in all the company's shops, and a large number of men have already been discharged.

Burlington & Southwestern.

General Baker, the Receiver appointed by the United States Circuit Court in the foreclosure suit, has made a formal demand on Mr. McKitterick, the Receiver of the State Court in the Ward suit, for possession of the property. Mr. McKitterick refused to yield possession and is still running the road. It remains to be seen what further action will be taken.

Wisconsin Valley.

The track was laid to Wausau, Wis., 20 miles north of the late terminus at Knowlton and 92 miles from Tomah, October 31. The work is being finished up and regular trains will begin running about November 15.

Dividends.

Dividends have been declared by the following companies:

Cleveland & Pittsburgh, 1¾ per cent., quarterly, on the new guaranteed stock, payable December 1.

Boston & Albany, 5 per cent., semi-annual, payable November 16.

Pennsylvania, 5 per cent., semi-annual, payable November 30 to ladies only, to all others December 1.

The Ohio & Mississippi Company gives notice that the preferred stock scrip dividend due March 1, 1875, will be paid with accrued interest to date of presentation on and after November 10, 1874, at the office of the company, No. 52 William street, New York.

Meetings.

The following companies will hold their annual meetings at the times and places given:

Boston & Providence, at the new passenger station in Boston, November 18, at 11 a. m.

Baltimore & Ohio, at the office in Camden Station, Baltimore, November 16, at 10 a m.

Wilmington & Weldon, in Wilmington, N. C., November 18.

Wilmington, Columbia & Augusta, in Wilmington, N. C., November 18.

Delaware Shore.

The contract for the grading and bridging of this road, from Woodbury, N. J., to Penn's Grove, 20 miles, has been let to James E. Neal of Philadelphia, who is to begin work about November 20.

Missouri, Iowa & Nebraska.

An agreement has been made by which this company is to run its trains into Keokuk, Ia., over the Keokuk & Des Moines track, paying a fixed annual rental for its use. The agreement has still to be ratified by the directors of both companies.

Delaware, Lackawanna & Western—Morris & Essex Division.

The contractor having made a reduction of 10 per cent. in the wages of the men employed on the new Bergen Tunnel, 490 of them struck and left work November 9. It is stated that the company will suspend all work for the present unless the men agree to go to work again at the reduced rates.

Boston, Clinton & Fitchburg.

The following is a summary of the report of this company for the year ending September 30, 1874, covering the operations of all the leased lines except the New Bedford road:

Earnings from passengers	$243,629 93
Freight	395,149 38
Other sources	26,861 12
Total earnings ($6,862 per mile)	$665,640 43
Operating expenses (66.98 per cent.)	445,873 19
Net earnings ($2,266 per mile)	$219,767 24
Interest on bonds and dividends on guaranteed stock	$111,987 05
Mansfield & Framingham and Framingham & Lowell rentals	81,917 66
	$193,904 71
Surplus	$25,862 53

As compared with the previous year there is a decrease of $11,798.96 or 1.74 per cent., in earnings; a decrease of $34,071.18, or 7.10 per cent., in expenses; an increase of $22,272.22, or 11.28 per cent., in net earnings. Passenger trains ran 233,501 miles and carried 572,600 passengers; freight trains ran 289,524 miles and carried 454,137 tons of freight.

A large part of the road has been relaid with new and heavier iron, and Tyler's safety switches have been put in use throughout. The equipment has been increased and much improved and Smith's vacuum brake put on all passenger trains.

Delaware, Lackawanna & Western.

It is stated that this company has given the New Jersey Central notice of the termination of the agreement by which 600,000 tons of coal annually were to be sent over the Central from Hampton Junction to Elizabethport. This arrangement, according to the notice, will cease May 1, 1875. By that time the improvements now being made in the coal docks at Hoboken will be completed, and the company will be able to handle all its coal at that point without trouble.

Washington City, Virginia Midland & Great Southern.

The people of Charlottesville, Va., have voted to issue $30,000 bonds to secure the erection of an engine house and repair shop at that place.

The Western Railroad Bureau.

A meeting of the Commissioners and the executive Committee of the General Freight Agents' Association was held last week in Toledo, O. It was resolved that the new rates should take effect November 15. The adjustment of the tariff and the classification of freights was completed, many articles having been advanced one grade in the classification.

The new rates on East-bound freight are as follows to leading points:

From Chicago to	1st class.	2d class.	3d class.	4th class.
Boston, per 100 pounds	$1 60	$1 20	$0 85	$0 50
New York	1 50	1 10	0 80	0 45
Philadelphia, Baltimore and Washington	1 40	1 00	0 70	0 40
Pittsburgh	0 90	0 75	0 45	0 30
Richmond, Va.	1 63	1 18	0 83	0 57
Charleston and Savannah	1 81	1 31	1 03	0 67

The Grand Trunk and Baltimore & Ohio still decline to sign any agreement.

Chicago & Pacific.

The application of the Chicago & Northwestern for an injunction to restrain this company from crossing its tracks at grade at Elgin, Ill., came up before the United States Circuit Court in Chicago, November 7. After hearing arguments, Judge Drummond decided that the Court had jurisdiction, and that it must be governed by the facts in this particular case. He therefore decided to appoint Commissioners to examine into the facts in the case and his final decision will depend on their report.

New Mail Routes.

Mail service has been ordered over the following lines:

Allegheny Valley, Sligo Branch, from Lawsonham, Pa., to Sligo, 11 miles.

Peachbottom, from York, Pa., to Cross Roads, 16 miles.

Eastern.

This company has bought a tract of nine acres in Charleston, Mass., and will occupy it as a freight yard in addition to the present yard in East Boston. A freight house 1,500 feet long with all necessary offices is being built, and some old buildings already on the ground are being altered for use as freight sheds. Sidings are being laid and drive-ways arranged so that, besides the shed-room, freight can be passed directly from cars to teams. The improvements will cost about $800,000 and will be completed before the close of the year.

New York & Long Branch.

Work on the grading is in progress near Long Branch, and piles are being driven for the bridge over South River. The passenger equipment for the road has been ordered and is to be ready by June 1, 1875, so that it is evidently intended to have the road open for the travel of next season.

Railroad Manufactures.

It is reported that the Rogers Locomotive Works at Paterson, N. J., are about to employ a largely increased force.

It is proposed to build a shop, the specialty of which will be the construction of Roberts' double-exhaust locomotive, in Buffalo, N. Y, or Titusville, Pa.

The Wason Car Company at Springfield, Mass., has secured a contract for 42 first-class passenger cars for the Central Railroad of New Jersey. These cars are to be finished by June 1, 1875, and most of them are intended for use on the new Long Branch line. The Wason Company is also negotiating for several other contracts.

The Cummings Car Works at West Bergen, N. J., have a moderate force employed, mostly on passenger car work.

Macon & Brunswick.

Holders of first-mortgage bonds of this road, which is shortly to be sold to satisfy the State lien, are requested to communicate with Moran Brothers, No. 68 William street, New York.

Monticello & Port Jervis.

In the foreclosure suit against this company, holders of first-mortgage bonds are requested to produce the same before Henry I. Cullen, referee, at his office, No. 194 Broadway, New York, before November 25.

Chicago, Burlington & Quincy.

There has been some trouble between this company and the Chicago & Northwestern as to the new pontoon bridge over the Mississippi at Clinton, Ia. The Northwestern Company owned an island in the river over which right of way was desired for the new bridge but refused, and it seemed probable that a long law-suit would result.

The latest advices state that a conference was held by officers of the two companies in Chicago, November 7, when an agreement was made for joint use of the bridge on terms satisfactory to both parties.

Brakes on the Delaware, Lackawanna & Western.

It was announced in the RAILROAD GAZETTE of September 5 that the Delaware, Lackawanna & Western Railroad Company had adopted the atmospheric brake on the Utica Division and main line of its road. This item was copied from one of our exchanges, and, as we have since learned, was an error, as it was the vacuum and not the atmospheric brake which the above company has adopted, on its main line, on the Lackawanna & Bloomsburg and Syracuse & Binghamton divisions. It was, however, before the adoption of the vacuum brake, and is still using the Westinghouse (atmospheric) on some of the other divisions of its lines.

Montclair.

The first-mortgage bondholders met in New York, November 5, when there was considerable discussion on the report presented by the committee at the meeting of October 6. The leading feature of this plan was the issue of new bonds to the amount of $2,500,000, which are to be exchanged bond for bond for the present first-mortgage bonds, the surplus to be used for completing the road. Mr. C. W. Hassler presented another plan providing for the organization of a new company and for new issues of bonds to replace those now outstanding. Finally after a long discussion it was resolved that the trustees, Messrs. Abram S. Hewitt and Marcus L. Ward, be instructed to buy in the road at the foreclosure sale. They are also, in connection with an advisory committee of five bondholders, to prepare an agreement to be signed by the bondholders.

Hoosac Tunnel Line.

A referee appointed by the Massachusetts Supreme Court is now taking testimony to determine what proportion the Fitchburg and Vermont & Massachusetts companies shall pay of the cost of relocating and rebuilding the Troy & Greenfield road.

South Mountain.

Grading is in progress on the branch from the main line to Reading, Pa.

Arrangements have been made for the issue of the first-mortgage bonds of the company, and some have already been sold. Messrs. Hiester Clymer, of Reading, and G. Dawson Coleman, of Lebanon, are the trustees under the mortgage.

Central Vermont.

The shops on all this company's lines have been run only nine hours daily since November 1, with a reduction of 10 per cent. in wages.

North & South of Georgia.

In the New York Supreme Court, November 10, Adolphus C. Schaefer recovered judgment for $75,000 against this company. The plaintiff claimed that he had contracted to sell $1,500,000 bonds for the company, for which he was to receive 5 per cent. commission. The company failed to fulfil its contract, and he now sues to recover the whole commission.

East Tennessee, Virginia & Georgia.

Suit has been brought by Hawkins County, Tenn., to compel this company to operate the Rogersville Railroad from Bull's Gap to Rogersville.

The company bought this road from the State of Tennessee, agreeing to keep the road in repair and run it, but subsequently sold it to W. P. Elliott & Co., who have failed to operate.

The Conductors' Brotherhood.

The annual convention of this society met in Baltimore, Md., November 3. In his opening address the Grand Chief Conductor, Mr. G. L. Cruzby, represented the order as being in a flourishing condition, seven new divisions having been organized during the year. Attention was called to some needed revisions of the constitution.

Standing committees on constitution and by-laws, on finance and on work were appointed. The insurance question was considered, and the Secretary reported the number of members of the body insured at 156, from whom had been received $3,385; paid out out $1,350, leaving a balance in the treasury of $2,035.

The sessions, which were mainly private, continued until November 6. It is understood that a new form of ritual was adopted and other measures were taken to increase the efficiency of the Society.

After adjournment the delegates took an excursion to Washington on the invitation of the Baltimore & Ohio Company.

West Pennsylvania.

The Columbia Conduit Company has applied for an injunction to restrain this company from interfering with the laying of its oil pipe line. Some time since the Conduit Company endeavored to secure authority to lay its pipes under the West Pennsylvania track near Pittsburgh, but failed. Now it is laying the pipes in the bed of Power's Run, over which the railroad crosses on a bridge, and applies for an injunction on the alleged ground that it has reason to fear forcible interference with the work.

Franklin Telegraph.

At a meeting of the stockholders in Boston, November 6, it was resolved that the President be instructed to lease the company's lines for 99 years to the Atlantic & Pacific Telegraph Company at an annual rental of $25,000.

Fort Scott & Southeastern.

The Chief Engineer of this road, Mr. George D. Case, writes that the grading of this road is now finished for six miles southeast from Fort Scott, Kan., and tracklaying has been begun, some two miles being already down.

Pennsylvania.

At a special meeting of the board held November 3, the usual semi-annual dividend of 5 per cent. was declared. The official documents in detail were laid before the Finance Committee for report thereon to the board covering all the operations of the company east of Pittsburgh, and the following is a condensed statement of the result of the traffic for the past six months:

Gross receipts		$19,696,642
Expenses		12,450,963
Net earnings		$7,245,678
Income from investments		2,198,707
Total net receipts		$9,444,386
From which deduct interest upon bonds, outstanding scrip, semi-annual main line payment, etc., also dividends and interest on account of United Railroads of New Jersey and Delaware & Raritan Canal		4,302,529
Balance		$5,141,856
Revenue held to meet possible deficiencies arising from guarantees of the company from leases, and to provide for contingencies		876,333
Leaving as available for dividend, net revenue		$4,265,523
Capital stock, $68,443,300, at 5 per cent.	$3,422,165	
State tax on same	307,994	
		3,730,159
Balance to credit of profit and loss		$535,364

Illinois Central.

The Land Department reports during October sales of 3,748.65 acres of land for $27,714.91, and cash collections amounting to $35,880.11.

The Traffic Department reports for October earnings as follows:

	1874.	1873.
In Illinois, 707 miles	$610,018.20	$610,728.31
In Iowa, 402 miles	194,078.75	186,393.23
Total, 1,109 miles	$804,096.95	$797,121.54

This shows a decrease of 0⅛ per cent. in the Illinois earnings; an increase of 4¼ per cent. in the Iowa receipts, and an increase of 0⅞ per cent. in the total.

Worcester & Somerset.

The bondholders have filed a bill in foreclosure against this road in the Somerset (Maryland) County Court, and have also asked for an injunction to prevent certain judgment creditors from procuring executions under their judgments.

Missalonskee & Kennebec.

This company has completed its organization and has made arrangements for the survey of the line from West Waterville, Me., southward to Augusta. It is intended to ask the city of Augusta to take stock in the company.

Nevada County.

This company is advertising for bids for the construction of its road, which is to be about 22 miles long, from the Central Pacific at Colfax, Cal., to Nevada City. It is to be of 3-feet gauge. The work is to be paid for one-half in gold coin and one-half in the company's bonds. Proposals will be received until November 21. The company's address is Nevada City, Cal.

Chicago & Illinois River.

This road is now completed for 20 miles southwest from Joliet, Ill., and grading is going on rapidly towards Streator. The present terminus is in the Wilmington coalfield, and several short branches are being built to reach certain mines. The road, indeed, is intended mainly for coal traffic. From Joliet to Chicago two lines have been surveyed, but nothing definite has been decided as to the construction of this part of the line. The road is being built by the Chicago Railway Construction Company, which owns large tracts of coal land on the line.

Martha's Vineyard.

The rolling stock of this road has been attached for debt and the running of trains temporarily stopped.

Little Rock Bridge.

In the first number of the RAILROAD GAZETTE for this year, page 8, we published the following announcement:

"The bridge over the Arkansas River at Little Rock was finally completed December 21, and trains are now passing over it. The bridge consists of four fixed spans, two of 191 feet, one of 183 feet, and one of 60 feet, and a draw-span 355 feet long, with two clear openings of 160 feet each. The bridge rests on pneumatic cylinders of iron filled with concrete. The draw-span is wholly of iron, the fixed spans of wood and iron. The bridge is so designed that a roadway for highway travel can be laid, resting on the upper chord, which will probably be done hereafter. The American Bridge Company of Chicago constructed this bridge."

We were, therefore, surprised to find that English papers of Oct. 24 have advertisements of Messrs. George Burnand & Co., of London, offering an issue of £200,000 in the first mortgage 7 per cent. bonds of this company, redeemable in 22 annual drawings, beginning in 1877, at 87½. The prospectus announces that the company purposes to construct a bridge over the Arkansas at Little Rock, which will be 1,080 feet long, with a highway over the railroad tracks. It speaks of the structure as having the materials for the piers and substructures nearly ready to put down, that it is under contract, and to be completed by Oct. 1, 1875. The Union Trust Company is given as the trustee under the mortgage. Altogether the advertisement looks like one prepared for publication two years ago. It

says that four railroad companies have contracted to use the bridge and pay 25 cents per passenger, and $3.50 per car of freight which they shall take across it, while three of them guarantee a minimum toll of $25,000 per year, which the fourth will do also when its road is completed; also that two of the companies last year ferried across the river traffic which at the above rates would have paid the bridge company £23,090. No names of officers or directors of the bridge company are given in the advertisement.

Delaware River & Bound Brook.

Mr. Hugh Rehill, of Elizabeth, N. J., who has the contract for 19 miles of grading from Bound Brook, N. J., to Pennington, has begun work and will shortly have 500 men employed.

Connecticut & Passumpsic Rivers.

The working hours in the shops have been reduced to eight, with corresponding reduction in pay. Wages of section hands have been cut down 15 per cent.

The Iowa Railroad Law.

The Burlington & Missouri River Railroad Company has brought suit in the United States Circuit Court for an injunction to restrain the Attorney-General of Iowa from bringing any more suits against the company for violation of the railroad law until those now pending are disposed of.

Kansas Pacific.

Officers of this company met those of the Union Pacific at Omaha, November 5, to effect an adjustment of freight and passenger rates on all competing traffic.

Dayton & Southeastern.

Meetings are being held all along the line of this projected road, and many subscriptions are being secured. The line is from Xenia, O., east by south through Washington & Chillicothe to the coal fields of Jackson County. It is to be a narrow-gauge road.

Georgia Railroad Taxation.

Four companies only have complied with the new tax law and made the necessary returns, the Northeastern, Savannah, Skidaway & Seaboard, South Carolina and Atlanta Street railroad companies. The taxes assessed on these were all small amounts. The Atlantic & Gulf, Atlanta & West Point, Augusta & Savannah, Augusta & Summerville, Central, Eatonton Branch, Georgia, Rome, Southwestern and Western & Atlantic have paid income tax under the old law and will contest the validity of the new one. Executions have been issued against the Alabama & Chattanooga, Atlanta & Richmond Air Line, Savannah & Charleston and Selma, Rome & Dalton companies to compel their compliance with the law. The whole amount of tax involved is about $175,000.

Georgia Railroad Legislation.

An organized effort is being made to secure from the next Georgia Legislature the passage of a bill to regulate rates of freight on the railroads of that State. Much complaint is made of discrimination between towns, much of which seemed to be based on the usual and necessary distinction made between through and local rates.

Chicago, Rock Island & Pacific.

The freight engines on the Iowa Division, now run across the Mississippi to Rock Island, instead of stopping at Davenport as heretofore, thus making Rock Island the end of the division.

The suits brought by the city of Davenport, Ia., to recover back taxes from this company have been concluded by a compromise. The company agrees to pay $10,000 as taxes for 1867, 1868, 1869, 1870 and 1871, and a judgment for that amount is to be entered and paid up within 30 days. The city agrees also to accept $1,000 in full for taxes of 1872, 1873 and 1874. This closes a tedious litigation.

Savannah & Memphis.

By the prompt completion of this road 60 miles from Opelika, the company secures the State subsidy of $4,000 per mile on a third section of 20 miles. Work is being pushed forward on the grading from the present terminus at Atkins' Gap to the crossing of the Selma, Rome & Dalton at Childersburg, a distance of 20 miles.

Lake Shore & Michigan Southern.

The master mechanics and nearly all the shop foremen of the Toledo Division shops at Norwalk, O., have been discharged, and it is alleged that numerous irregularities and frauds in the management of the shops have been discovered.

Union Pacific.

The trustees of the Omaha Bridge mortgage give notice that, in accordance with the provisions of the mortgage, 47 bonds have been selected by lot and will be redeemed as provided at the London & San Francisco Bank, London, or the office of Drexel, Morgan & Co., New York, April 1, 1875. The numbers of the bonds drawn are: 85, 96, 168, 191, 234, 256, 282, 298, 324, 356, 541, 545, 563, 571, 574, 594, 643, 828, 857, 960, 1104, 1122, 1128, 1148, 1156, 1158, 1203 1207, 1258, 1327, 1333, 1400, 1429, 1562, 1595, 1611, 1653, 1758, 1776, 1963, 2017, 2079, 2080, 2182, 2194, 2238, 2398.

Napa & San Rafael.

It is proposed to build a narrow-gauge railroad, from San Rafael, Cal., northeast to Napa, a distance of 32 miles. The project includes an extension of about 50 miles northward from Napa, with one or two short branches.

Southern Pacific.

On the San Joaquin Valley line, the track is laid to Bakersfield, Cal., three miles beyond the late terminus at Kern River and 47 from Goshen, the northern end of the line.

Southern of Long Island.

It is stated that hereafter through trains will be run to Patchogue passing over the Flushing, North Shore & Central to Babylon and thence over the Southern. Under this arrangement passengers from east of Babylon will have choice of two routes.

Wood River Branch.

This road has been completed and in operation since July last. It is 5¼ miles long, and runs from the New York, Providence & Boston at Richmond Switch, R. I., through Woodville and Hope Valley to Locustville. It is worked as a branch of the New York, Providence & Boston, and that company has a considerable interest in the stock.

Watertown.

A company by this name has been organized to construct a railroad from the village of Watertown, in Rock Island County, Ill., to the northeasterly boundary of the county some five miles and also to construct branch railroads from such main line to any point on the south and east boundary lines of said county. The amount of capital stock is fixed at $55,000. The President of the company is Alexander Mitchell, of Milwaukee, Wis.

Springfield & Illinois Southeastern.

In the United States Circuit Court, November 2, an order was entered directing C. A. Beecher, Receiver, to make such settlement of claims due for labor performed before January 14, 1874, as may seem to him just and necessary for the protection of the property. This settlement or compromise must be assented to by M. H. Bloodgood, the agent for the bondholders who have joined in the purchase of the property.

In the matter of R. Irwin & Co., holders of certain bonds, it was ordered that the bondholders concerned in the foreclosure and the Master who made the sale should appear at the next term of the Court and show cause why the petition should not be granted.

New Jersey West Line.

This road is to be sold under foreclosure of mortgage December 26. It is completed for 16 miles from Summit, N. J., west to Bernardsville, and nearly all the grading from Summit east to Newark was done three years ago.

Boston & Albany.

The following summary of the business for the year ending September 30, 1874, has been published:

Earnings from passengers	$3,015,876
Freight	5,283,099
Other sources	664,152
Total earnings ($33,445 per mile)	$8,963,127
Operating expenses (73.06 per cent.)	6,548,211
Net earnings ($9,911 per mile)	$2,414,916
Interest	$341,554
Dividends (10 per cent.)	1,986,410
Pittsfield & North Adams rental	27,000
Ware River rental	37,500
	2 392,464
Surplus for the year	$22,452

As compared with the previous year there is a decrease of 8½ per cent. in earnings; a decrease of 13¾ per cent. in expenses, and an increase of 8 per cent. in net earnings.

The board of directors has declared the usual semi-annual dividend of 5 per cent.

Lisbility of a Company for Contractors.

The Court of Appeals of New York has just given a decision of some importance in the case of McCafferty against the Spuyten Duyvil & Port Morris Railroad Company. This was a suit brought to recover damages for injury done to private property by the carelessness of a sub-contractor in blasting. The suit was first brought in the Supreme Court, and the company was held not liable. The General Term of the same Court reversed this decision, and now the Court of Appeals has sustained the original decision, and holds that the contractor who employed and superintended the men is liable, and that no damages can be recovered from the railroad company.

Grand Trunk.

The Toronto (Ont.) *Monetary Times* of November 6 says: "It is stated in Montreal that the Canada Rolling Stock Company and the Canada Railway Equipment Company have both sold out to the Grand Trunk Railway Company: the consideration paid is said to be in the neighborhood of $1,250,000, for the right and effects of both concerns."

Railroad Taxation in New Jersey.

In a suit brought by the Morris & Essex Company against the State Commissioner, the New Jersey Supreme Court has decided that while under the original charter of 1835 the main line of this road is exempt from all taxation except the 0¼ per cent. on the capital stock provided for in the charter, the Phillipsburg Extension and the Boonton Branch, the charters for which was obtained in 1865, are subject to taxation under the law of 1873. The constitution of 1846 provided that the charter of any corporation which should be granted thereafter should be subject to alteration or repeal by the Legislature.

This decision also by implication affirms the constitutionality of the railroad tax act of 1873.

Cairo & St. Louis.

Track has been laid from Cairo, Ill., northward five miles. At that point it was suspended for a day or two to wait the arrival of bolts for the rail joints.

New Brunswick.

This road is now in operation from Gibson, N. B., on the St. John River, nearly opposite Fredericton, westward to Northampton, and thence northward to Florenceville, 71 miles from Gibson. It follows pretty closely the general course of the St. John River. A branch, nine miles long from Woodstock Junction (52 miles from Gibson) west to Northampton is also in operation. The road is of 3 feet 6 inches gauge, and runs through a heavily timbered district.

Canada Central.

Arrangements are being made to begin work on an extension of about forty miles from the present terminus at Renfrew, Ont., northwest up the valley of the Ottawa to Pembroke. The gauge of the road is to be changed to 4 feet 8½ inches.

Castle Shannon.

A new inclined plane to be used by the passenger trains is being built in Pittsburgh. It extends from Carson street in the South Side to Mount Washington and has a lower grade than the coal incline now in use. A large force is at work and it is nearly finished.

Montpelier & Barre.

The contractor, Mr. C. P. Kimball, has put a considerable force on the grading and intends to have the road ready for the iron by spring.

Grand River Valley.

The United States Circuit Court has given judgment in the case of James H. Blake vs. the City of Grand Rapids, for $29,092.21, on bonds issued in favor of the Grand River Valley Railroad Company.

Wallkill Valley.

Stock in this company is not judged to be a very valuable investment, as 700 shares of it were sold at auction in Kingston, N. Y., recently for $1.50 per share.

Atlantic, Mississippi & Ohio.

An arrangement has been made by which the exchange of express business will be resumed between the Southern Express and the express line over this road, which is run by the railroad company itself. For some time past this exchange of business has been broken off.

Utah Western.

The iron for this road has been bought and shipped and tracklaying will be begun as soon as it arrives at Salt Lake.

Frankford & Breakwater.

The directors have declined to accept this road from the contractors, it being alleged that the work is not completed according to the specifications.

Washington, Cincinnati & St. Louis.

The Rockingham (Va.) *Register* says: "The grading of the narrow-gauge railroad from Harrisonburg to Bridgewater was completed on Friday last. The whole road from this place to a point beyond Sangersville is now ready for the ties and iron. The next section has been let to J. W. F. Allemong, who will push the work of grading forward."

Lafayette, Muncie & Bloomington.

The board of commissioners of Tippecanoe County, Ind., have brought suit against this company, the object being to release the county from a subscription to the stock made with the understanding that the shops would be located in Lafayette. Before the completion of the road the company passed out of the hands of the original incorporators, and the shops were placed elsewhere, and hence the county is not disposed to pay over the amount voted, $373,000, and is desirous of having refunded $136,000 of this amount which the company has received.

Central, of Minnesota.

The track has been laid to Wells, Minn., on the Southern Minnesota Railroad, 36 miles south by east from Mankato, which is all of the road which is to be built at present. Regular trains will begin to run very soon. The traffic of this road can be conducted either with the St. Paul & Sioux City or the Southern Minnesota, and the Winona & St. Peter also will be glad to get it, doubtless.

Great Western of Canada.

The Secretary announces that the allotment of new shares, which were first offered to the shareholders in proportion to their holdings, and those not taken afterwards to the whole body of shareholders at about 49 per cent. of their faces, were all taken at these rates, so that none could be offered to non-shareholders.

Pacific Mail.

It is reported that negotiations are pending for an adjustment of differences with the Union and Central Pacific companies. The basis of the agreement under discussion is said to be that the China freight shall hereafter go to and from San Francisco by rail instead of by steamer by way of Panama.

ANNUAL REPORTS.

Western Maryland.

This company owns a railroad from Baltimore, Md., west by north to Williamsport, 90 miles. The road formerly ran to the Northern Central at the Relay House, but last year a new line was built from Owings' Mills to Baltimore.

In the original transfer by the Northern Central to the Western Maryland Company of the Green Spring Railroad, extending from the Relay to Owings' Mills, it was stipulated that should the Western Maryland Company subsequently construct an independent line to the city of Baltimore, it should re-transfer the Green Spring Railroad to the Northern Central Company. Agreeably to this provision a re-transfer of nine miles was made in July last, the Western Maryland Company reserving, under a satisfactory arrangement, that portion included in and composing its main line between Owings' Mills and Green Spring Junction, about one and one-fourth miles.

By the latest report the property was represented as follows:

Stock ($7,592 per mile)	$683,243
Bonds ($4 ,833 per mile)	3,675,000
Total ($46,425 per mile)	$4,358,243

There is besides about $171,000 funded coupons. A large portion of the bonds are endorsed by the city of Baltimore.

The operations for the year ending September 30 were:

	1874.	1873.
Earnings from passengers	$131,028 04	.....
Freight and milk	139,380 74	.....
Other sources	7,383 46	.....
Total earnings	$277,792 24	$218,384 28
Operating expenses	194,442 38	192,083 69
Net earnings	$83,349 86	$26,300 59
Gross earnings per mile	3,087 00	2,569 00
Net " "	926 00	309 00
Per cent. of expenses	70.00	87.96

The increase in earnings was $59,407.96, or 27.2 per cent.; in expenses, $2,358.69, or 1.2 per cent.; in net earnings, $57,049.27, or 216.9 per cent.

Besides the ordinary expenses of the Transportation, Machinery and Road Departments, there are included in the statements for 1874, $15,643.02 of general expenses not heretofore reported in this connection, and $5,953.52, paid in street car fares and drawbacks on drayage, the first of which has been wholly discontinued, and the latter substantially so since 1st June; $52,103.53 of the above balance has been applied to the construction of new side tracks, platforms, buildings, improved bridges, equipments, etc, etc. Over four miles of new rails were laid during the summer, and the track generally has been much improved; 2,100 feet of new sidings and switch connections have been laid, 1,003 feet of new truss bridges and 1,044 lineal feet of passenger and milk platforms have been erected; one ten-wheel locomotive has been thoroughly rebuilt, and $10,966.23 expended in ballasting the old road.

Much of the road between Gorsuch and Union Bridge must be reironed, tied and ballasted during the current year, after which it will be in condition to work at a minimum cost, with an increased business capacity.

During the year there have been 255,392 passengers moved, while in '73 there were 149,603, making an increase of 105,789, or over 70 per cent.; and in receipts therefrom of $82,149.68. The inactivity in railroad construction since the great monetary crisis of years ago, has so depressed the iron market, that there seems a general disinclination on the part of manufacturers to produce metal at present prices, hence the almost total suspension of the ore business and the loss to it of a large and profitable tonnage.

The locomotive mileage was 335,305 miles, of which there was in passenger service 170,201 miles, in freight 124,289, and in road service 40,815 miles, or respectively 51 per cent., 37 per cent, and 12 per cent. The average cost of locomotive service was $12.60 per 100 miles run, exclusive of wages of engineer and fireman.

Under a recent arrangement with the Baltimore & Potomac Company for trackage through their tunnel, it is believed a moderately remunerative coal business can be done with Canton, but it will be necessary to procure additional and more suitable equipment.

Pending negotiations with the Baltimore & Potomac road for use of tunnel, a reconnoissance was made of a connection between this road and the Union road via Woodberry, passing through the depression immediately west of Druid Hill Park, and along the east side of Jones' Falls to Union Junction.

The line would be about 3½ miles in length, and could be quickly and cheaply constructed.

The Baltimore & Potomac Company in the meantime evincing a disposition to co-operate in through arrangements, the scheme of an independent connection was for the present abandoned.

This Company in its competition with the Baltimore & Ohio road has been able to make a fair division of business, notwithstanding the many disadvantages it has had to labor under in handling its bulky and and low-priced freights at Fulton Station, against the superior terminal facilities offered by its great competitor, and it has now entered into mutually advantageous arrangements with the Northern Central and Union roads for working bulk freights to and from North street and Canton.

The report says "It is not the policy of your directors to rest satisfied with a road to Williamsport, but in view of the great importance to yourselves and the city of Baltimore, steps will be taken as early as practicable to secure two important extensions or branches, which if successful, will make the Western Maryland one of the important roads of the country, and will be the means of largely promoting the growth and trade of the city, by bringing to it business entirely new,

enabling it to recover that which it has temporarily lost, and securing it in much that it now possesses by warding off or neutralizing the encroachments of her rivals."

New York, Providence & Boston.

This company owns a line from Groton, Conn., opposite New London, northeast to Providence, R. I., 62¼ miles, and it works also the Westerly Granite road, 1½ miles, and the Wickford Railroad, 3¼ miles, making 67½ miles in all.

The property is represented as follows:

Stock ($40,000 per mile owned)	$2,500,000
Bonds ($20,048 per mile)	1,253,000
Total ($60,048 per mile)	$3,753,000

This represents also an investment of $425,000 in the Stonington Steamboat Company.

The operations for the year ending August 31 were:

	1874.	1873.
Passengers	$457,936 24	$480,696 17
Freight	369 168 92	355,077 40
Other sources (including dividends on steamboat stock)	120,254 70	97,857 73
Total earnings	$947,359 86	$933,631 30
Operating expenses	563,723 28	550,311 35
Net earnings	$383,636 58	$383,319 95
Gross earnings per mile	$14,035	$13,832
Net " " "	5,683	5,679
Per cent of expenses	59.50	58.94

The increase in earnings was $13,728.56, or 1.47 per cent.; in expenses, $13,411.93, or 2.44 per cent.; in net earnings, $316.63, or 0.08 per cent.

The traffic of the year was as follows:

	1874.	1873.
Through passengers	166,374	173,044
Local "	371,644	377,315
Commuters	99,742	106,192
Total passengers	637,760	656,551
Tons through freight	189,950	188,065
" local "	64,160	59,689
Total tonnage	254,110	247,754

The mileage of passenger and freight trains was 471,415; construction trains, 15,015; total, 486,430 miles.

A summary of the income account is as follows:

Balance from previous year	$29,066.07
Net earnings	383,636.58
Bonds sold	50,000.00
New stock (including $2,139.50 premium)	454,279.50
	$916,982.15
Dividends (10 per cent.)	$231,090.00
Interest	82,700.00
Extra expenses	1,410.77
Construction account	335,092.35
Bonds due and paid	7,000.00
Wood River Branch stock	20,000.00
	677,293.12
Balance to new account	$239,689.03

During the year the second track has been completed from Stonington to Providence, 50 miles, and is now in use. In repairs of the old track 500 tons new iron and 27,000 ties were used and 5,000 old rails were repaired and relaid.

The policy of running short local trains out of Providence has been continued and will, it is believed, bring in a full return hereafter.

Arrangements have been made to equip and work the Warwick Railroad when completed.

The increase of capital stock, of which 20 per cent. was called in just before the close of the last fiscal year, was completed in October, excepting 720 shares, which were disposed of by public auction, in April, at 125, and the premium obtained, amounting to $18,000, was divided pro rata among the parties entitled thereto.

The company holds $173,000 of the 7 per cent. bonds of the issue of 1869. $76,000 will be held to retire the 6 per cent. bonds due in 1878, and the balance will be available for future improvements.

Working Single Track Railroads in England and America.

In reporting on the disastrous collision on the Great Eastern Railway at Thorpe, Captain H. W. Tyler, Chief Inspector of the Board of Trade after describing the line in the vicinity of the station, gives the following account of the rules by which the train was run, the gross violation of the rules of the road in respect to sending train orders by both the telegraph clerk and the inspector who gave the orders, and the concluding discussion of the general subject of working single-track railroads. The neglect of the men to observe the rules intended to serve as a check on mistakes and misunderstandings is almost exactly similar to what we have more than once noted in connection with accidents in this country, and indicates a laxness of discipline quite common here, but which we did not expect to find in England.

This is the most serious collision between trains meeting one another on a single line of rails, if not the most serious railway catastrophe as regards the numbers of lives lost and serious injuries, that has yet been experienced in this country. In discussing the circumstances under which it occurred it will be necessary first to consider the system adopted in the working of the line, and how far it was liable to break down in consequence of mistakes or misunderstandings on the part of the servants of the company employed to carry it out; secondly, to examine the immediate causes by which the accident was produced, and the blame to be attached to the servants of the company implicated; and thirdly, to consider the principles generally adopted in the working of single lines, and the means by which the risk of accidents of this nature may be best provided against. The system employed may, as will be observed from the evidence, be easily described. Referring to the particular portion of the line in question, no engine-driver, whether running punctually or not, with a regular train or with a special train, was allowed to leave either Norwich or Brundall without instructions being handed to him on a printed form authorizing him to proceed on his journey. The duty of formally starting the engine-driver in this manner devolved on the inspector on day or night duty at Norwich, and on the station-master at Brundall. So long as the trains were running punctually, according to properly-arranged working time-tables, there could, of course, in no case, be any risk of such a collision. It was only when special trains were employed, or when there were alterations from the crossing-places laid down in the time-tables, that elements of risk were introduced. Before trains were allowed, in consequence of unpunctuality or otherwise, to cross each other at places not appointed in the working time-tables, telegraphic messages in simple forms always adhered to had to be exchanged between the two stations. At Brundall the responsibility rested on the station-master alone. It was his duty to work the telegraph instruments, as well as to arrange for any alterations in the crossing-places of the trains. At Norwich this duty was divided between the inspector and the telegraph clerk. It was the duty of the inspector to write, or to employ the telegraph clerk to write, and when written to sign, any message on single-line business; it was the duty of the clerk to transmit such message when signed; and it was, further, the duty of the inspector to sign the reply, without which the message was not considered complete, and which, when properly received, indicated that it had been well understood. So long as this system was strictly adhered to, no collision between meeting trains could be expected to occur; but there was clearly, in the event of any laxity of practice, less liability to mistake at Brundall, where one man was responsible for the whole arrangement, than at Norwich, where the duty of making and completing the arrangement, and of transmitting the message, was divided between an inspector and a telegraph clerk. But even at Norwich there was little if any risk of mistake if the inspector took care that no change of crossing-places was permitted without a proper message, signed by himself, being entered in the telegraph book for transmission, and a proper reply, also signed by himself, being received to show that it was understood; and if he at the same time acted in accordance with any arrangement he had thus made through the telegraph clerk with Brundall.

As regards this particular case, there appears to have been a misunderstanding in the first place between the station-master, Mr. Sproule, and Cooper, the inspector, as to whether, the express train being late, the mail train should be ordered up from Brundall, Mr. Sproule believes that, while engaged in signing letters and pay-sheets, he said "certainly not" in reply to Cooper's suggestion. Cooper says he understood him to assent to the suggestion, and went straight from Mr. Sproule's office to the telegraph window and acted upon it. Whatever be the truth of this matter, no danger ought, however, to have arisen in consequence of such a misunderstanding. The rules and practice in regard to the working of the single line ought in either event to have been sufficient to prevent the risk of any accident.

The blame, as regards the immediate causes of the collision, lies clearly between Inspector Cooper and Telegraph-clerk Robson. The evidence as to what passed between them rests mainly on their own statements, and they contradict each other in important particulars. It is difficult to believe that Inspector Cooper would, almost immediately after leaving the telegraph window, have informed Inspector Parker that he had not ordered the mail train up from Brundall, and that the express train might be started from Norwich, unless he had at that moment felt satisfied that the message which (according to his own statement) he directed Robson to prepare at 9:21 had either been delayed for want of his signature or had been canceled. And it is equally difficult to believe that if Robson had heard and understood Cooper to tell him (as Cooper states he did) to cancel the message, and had replied, "All right, Captain," he would, if he had previously transmitted the message, have failed to cancel it, or would afterwards have transmitted it in spite of its having been cancelled. It is evident there was a mistake, or misunderstanding, between Cooper and Robson, and that both were to blame. Cooper admittedly directed Robson to order the mail train forward from Brundall; and, having once done so, he ought to have made very certain either that the message was not sent, or that it was cancelled, and that no doubt could exist on the subject, before he permitted Inspector Parker to start the express train from Norwich. It is true that he had not signed the message, that it ought not to have been transmitted without his signature, and that he might suppose that even if it had been transmitted without his signature it ought not to have been acted upon at Brundall; but he should have taken care that on a subject of such vital importance there could be no possibility of a mistake. Having once given an instruction for bringing the mail train forward from Brundall, he ought to have clearly ascertained whether the message had been written in the book, whether it had been forwarded, and whether, if so, the usual reply to it had been received; and he ought to have made quite certain that no chance of error could exist, that it was struck out if written in the book and not transmitted, or that it was cancelled by a second message if it had been transmitted before the express train left Norwich. But, as qualifying these remarks, the excuse which Cooper had made, to the effect that he did not more formally cancel the message which was so unfortunately transmitted to Brundall because he did not think there had been time for either writing it in the book or transmitting it, must not be overlooked; and Robson's statement, that Cooper did not cancel the order for the message at all, must also be remembered.

The telegraph clerk, Robson, admits, as in fact his book shows, that he forwarded, on Cooper's verbal instructions, an unsigned message to Brundall, that the reply was at once returned from Brundall, and that thus the arrangement was complete for bringing up the mail train from Brundall at 9.26 p. m. And yet he waited for six minutes until 9.32 p. m., without taking any steps to call Cooper and make him sign the message and reply, both of which ought to have received his signature. He had a bell at hand which he might have rung at any moment, and which would no doubt have brought up an inspector, if not also the station master, from the next office, quickly to his window. But he made no use of it, and it was only, according to his own account, when the inspector of police (Trew) came on other business to the telegraph window at 9:32 p. m. that he made an inquiry concerning the express train, and ascertained that during those important six minutes it had run into the station, had started again for Brundall, and was probably about to come into collision with the mail, which was due to leave Brundall at 9.25, and which appears to have left that station by Norwich time at 9.27. In order to understand the gravity of his fault in sending an unsigned message, it must further be remembered that he forwarded to Brundall, as if it had been received, a signature which had never been attached by Cooper to the message. And there is an important discrepancy in the statements of the witnesses present in the telegraph office. One of them affirmed that Robson sent not only an unsigned but also an unwritten message to Brundall on a verbal order from Cooper, and afterwards wrote in the single-line book the message, the reply to it, and a third message in anticipation of its being required. The time occupied in sending the message to Brundall and receiving the reply would account also for the difference between 9.21, when Cooper states he first went to the wicket, and 9.23 or 9.24, when, as the book shows, Robson commenced to write his entries in it. If Robson had never, as he states, previously sent an unwritten or unsigned message, it is difficult to understand how he could possibly rest in his office for those six minutes without taking measures for calling Cooper to sign the message and the reply which he had received to it. And the more so as he had at his hand a bell-cord, which he could easily have employed for the purpose. His excuse for not using it—because he feared that Cooper might complain, or, as he expressed it, might "make a row," and say he had rung the bell unnecessarily—cannot be considered valid, when the case was so vital and the risk so imminent. He must, apparently, have been transmitting the message to Brundall two minutes after the express train entered the Norwich station, and, say, two minutes before the mail train left Brundall. By ringing the bell to ask for Cooper's signature, even after he had sent the message and received the reply from Brundall, he might probably, by calling attention to the message, have shown Cooper the danger of starting the express train at 9.31, and thus have prevented the collision, even supposing he had not heard him cancel the order for the message. But at this time there were no less than four other young men with him, against orders, in the telegraph office, whose presence might naturally tend to divert his attention from his duties.

To sum up the case, as between Cooper and Robson, the blame must apparently attach to them respectively as follows: Cooper, after directing the fatal message to be sent, though it is true he did not sign it, and it ought not to have been sent, or to have been acted upon if sent, without his signature, failed to take such subsequent measures as should prevent the possibility of a mistake, and make certain that there was no misunderstanding in the matter before he allowed Parker to start the express train from Norwich. As an experienced and responsible officer such precautions might reasonably be expected from him. Robson forwarded to Brundall as signed an unsigned and apparently an unwritten message, which was, he admits, against his instructions, and which he at first stated he had never done before; and he received a reply to it by which the message was, so far as Brundall was concerned, perfected and completed. He then allowed six minutes to elapse without calling Cooper's attention to the fact that he had done so, while the express train was entering and leaving the station for Brundall, taking no trouble to prevent misunderstanding on a matter of such vital importance. Robson was further to blame in allowing four young men to be in the office where he ought to have been alone. Though he was not eighteen years old, he had for upwards of fourteen months been employed on the same duty, and he is a young man of great intelligence and apparently of good education.

Out of 16,062 miles of railway open for traffic in the United Kingdom there were 7,395 miles of single line at the end of 1873, as returned by the companies to the Board of Trade; and the various portions of single line making up the above total are worked under different systems, and under a variety of instructions, according to circumstances and the ideas of the officers of the companies. But the principles involved are few in number. Many years ago the collisions which occurred from trains meeting one another in consequence of mistakes in the working of single lines by telegraph led to the invention and adopton on many lines of the train-staff system; and it may be said, after considerable experience in the working of that system, that it has been attended with great, though not with entire success as a means of preventing accidents from trains meeting each other. When train tickets are used with the train staff there is still a liability to collision from trains following one another; but when the train staff only is employed, and when no engine or train is allowed to pass along a section of the line unless it is accompanied by the train staff appertaining to that section, then the risk of misunderstandings or mistakes is apparently reduced to a minimum. The safest mode of working a single line that has yet been devised is believed to be a combination of train staff and block telegraph. With the double check of the staff and the telegraph there must be an extraordinary combination of mistakes by several persons to produce a collision from trains meeting one another from any two stations. But, unfortunately, increased safety is purchased under such a system at some expense of freedom and convenience in working. And this is especially the case where the traffic is irregular and considerable, and where long continuous portions of single line have to be worked. In such cases other means have been adopted to effect that object. For instance, the station-masters, or persons in charge of the stations are not of themselves allowed on some lines to alter the crossing places of trains with each other, and can only do so under instructions from an officer of the company especially appointed to that duty. This officer, called a train despatcher, knowing from day to day by telegraph how all the trains on his line are running, is able, with or without the aid of diagrams, according to circumstances, to direct their movements, and the station-masters, or persons in charge of the different stations, are simply required to obey his instructions—either to send the trains on or to stop them, or to see that any two trains cross each other or pass each other at his station, as the train-despatcher may direct. This system is in operation on the continent of America over continuous lengths of single line for hundreds and hundreds of miles, the lines being divided into sections, with train-despatchers constantly employed on this duty, and having no other duty to perform, in central positions on each section; and it is also employed on considerable lengths of line in this country. But none of these systems, except perhaps the combination of block telegraph and train staff, have been worked with entire freedom from accident. Collisions have occurred frequently in working single lines under different systems by telegraph, not only when station-masters and others have been allowed to arrange with each other for the alteration of crossing places or passing places, but also when such alterations have been made under special instructions from specially-appointed or superior officers. Collisions have also occurred on lines worked under the train system—in one case when the superintendent of a railway, with his directors in a train, himself violated the train-staff regulations; and collisions may occur under any system that can be devised. Whatever checks may be established with a view to the avoidance, so far as possible, of mistakes and misunderstandings, it is necessary to work with human agents, and there is unfortunately a tendency, after working for a length of time securely under any system, to laxity of practice on the part of employes. They gradually acquire too much confidence in themselves and in their system. They cease to remember the importance of the checks or safeguards by which it is guarded. They fail while engaged in the daily routine of duties to realize the risks that may be incurred by a departure from strict rules, fixed practices and prescribed forms; and they only awake to the necessity for yielding themselves and requiring from others absolute adherence to rules and practice after some serious warning or some disastrous experience. The mode of avoiding laxity of this description is by the maintenance of rigid discipline, by constant, efficient and irregular supervision. The occurrence of an accident, and even of a very serious accident, under any particular system, should not be taken, without full consideration of all the circumstances, to be positive proof against that system. And it must always be remembered, as the result of all experience in railway working, that an inferior system, under good discipline, leads to better results than a superior system, without good discipline. On the occasion of so frightful an accident as the present, it is useful, with a view to the general knowledge and establishment of proper principles, and in order to obtain increased safety in the future, to recall and sum up such considerations; and it must not be overlooked with regard to this particular case that if only the inspectors at Norwich had, for instance, been in the habit of themselves writing the messages for altering the crossing places of the trains instead of employing, as they frequently did, the telegraph clerks to write those messages for them, the safety of the traffic would not have been dependent upon a verbal arrangement, or at all events there would have been less liability to any mistake or misunderstanding, and this collision would probably never have occurred. The important lesson, then, to be learnt from the circumstances of this most deplorable collision is, not so much that one system of single-line working is superior to any other system, as that whatever the system by which safety is sought to be secured, it should be fenced about with safeguards precisely expressed and carefully observed. That system may, however, be considered the best which can only fail under the most glaring disregard of detailed instructions, and under which advantage is taken of the improbability of several persons simultaneously concurring in the same neglect or mistake.

It is satisfactory to be able to add, in conclusion, that the company propose to open a second line of rails to the East Norfolk Junction, 1½ miles from Norwich, during the month of October; and then to work the line between the East Norfolk Junction and Brundall, so long as it remains single, by the combined train-staff and block-telegraph system.